

Aquilegia

Magazine of the Colorado Native Plant Society

Volume 47 No. 4 Winter 2023





2023 Photo Contest Winners

Front Page: First Place Winners. Clockwise from top left. **Colorado Native Plants:**

Hymenoxys grandiflora (old-man-on-the-mountain), © Joe Leahy; **Garden Natives:** private garden full of wildflowers, © Carol McGowan; **Artistic:** *Abies concolor* (white fir), © Susan Tamulonis; **Wildlife and Native Plants:** *Delphinium barbeyi* (subalpine larkspur) and *Hyles lineata* (whitelined sphinx moth), © Jim Pisarowicz; **Landscape:** *Aquilegia coerulea* (Colorado blue columbine), © Leslie Madson.

This Page: Left: **Second Place Winners.** Top: **Artistic:** *Dieteria bigelovii* (sticky tansyaster),

© Jim Pisarowicz; bottom: **Wildlife and Native Plants:** *Bouteloua gracilis* (blue grama grass),

© Rick Brune. Right: **Third Place Winner Artistic (tie):** *Oenothera glaucifolia* (false gaura),

© Rick Brune; see the back cover for the other artistic third place winner.

Back Cover: Second Place Winners. Top left: **Colorado Native Plants:** *Linum lewisii* (blue flax), © Jim Pisarowicz; bottom left: **Landscape:** *Rhodiola integrifolia* (king's crown), © Tom Lebsack; right: **Garden Natives:** *Stanleya albescens* (white prince's plume), © Molly Freilicher.

Inside Back Cover: Third Place Winners. Clockwise from top left. **Colorado Native Plants:** *Sidalcea neomexicana* (New Mexico checkermallow), © Linda Smith; **Artistic (tie):** *Bouteloua hirsuta* (hairy grama grass), © Michael Aubrey; **Wildlife and Native Plants:** *Oenothera suffrutescens* (scarlet beeblossom) and *Callophrys gryneus* butterfly, © David Rudin; **Landscape:** *Pinus ponderosa* (ponderosa pine), © Bill Bowman; **Garden Natives:** *Tradescantia occidentalis* (prairie spiderwort), © Jim Pisarowicz.

Aquilegia: Magazine of the Colorado Native Plant Society

Dedicated to furthering the knowledge, appreciation, and conservation of native plants and habitats of Colorado
through education, stewardship, and advocacy

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Featured Story

Synopsis of the Twentieth Annual Colorado Rare Plant Symposium

By Brenda L. Wichmann and the Colorado Natural Heritage Program Botany and Vegetation Ecology Team

The 2023 Colorado Rare Plant Symposium celebrated the twentieth anniversary of this annual event. Commemorative mugs were gifted to the attendees by the [Colorado Natural Heritage Program \(CNHP\)](#). The mugs were decorated with an illustration by Leslie Crosby depicting Rocky Mountain monkeyflower (*Erythranthe gemmipara*).

The symposium began with welcomes by Jessica Smith, CNHP Botany and Vegetation Ecology Team leader, and Dave Anderson, CNHP director. Presentations began with the CNHP review of select rare plants known from south-central and southeast Colorado, led by Dave. Summary information was presented on 19 taxa (Table 1), including a distribution map, photos of each plant and its habitat, last observation data, population size estimates, management concerns, and land ownership. Meeting attendees participated in the discussion of each taxon, adding information on recent observations, including population viability. Herbarium specimens from the University of Colorado Herbarium were available throughout the meeting for observation by attendees.

Following a break, partner updates from the Bureau of Land Management (BLM), Colorado Natural Areas Program (CNAP), and Denver Botanic Gardens (DBG) were presented. Carol Dawson, BLM lead for the Threatened and Endangered Species Program and the Plant Conservation and Restoration Program discussed the BLM Strategic Plan for the Threatened

and Endangered Species Program (2022-2027) and outlined BLM policy changes. Carol also discussed the 2023 revision of the Colorado BLM Sensitive Species List and plants on that list with ongoing research and/or inventory efforts.

Raquel Wertsbaugh, CNAP coordinator, provided a summary of the program, the program's work with rare plants of Colorado, and the interactive Colorado Natural Areas and Significant Features Map. She also discussed the upcoming 2025 Revision of the Colorado State Wildlife Action Plan (SWAP) before yielding the floor to Jessica Smith to present updates on CNHP's review of plants associated with the SWAP. The SWAP 2025 revision has begun, and a final draft revision is due for approval by the US Fish and Wildlife Service (USFWS) by September 30, 2025. The revision will be led by Colorado Parks and Wildlife (CPW) with contracted help from CNHP that includes opportunities for stakeholder input. As part of this revision process, CNHP is reviewing the ranks of the plants listed in the SWAP, those known as Plants of Greatest Conservation Need. Jessica outlined the details of CNHP's 2022–23 review, including rank changes to both Tier 1 and Tier 2 plants and taxonomic updates that may both add or remove taxa from the SWAP list, depending on criteria chosen in the upcoming revision.

Updates from DBG were presented by Jennifer Neale, director of research and conservation, and Jennifer Ackerfield, head curator of natural history collections and associate director of biodiversity research. ►



A few of the plants discussed at the 2023 Rare Plant Symposium. From left: *Astragalus anisus* (Gunnison milkvetch) © Lori Brummer; seed pods of *Draba smithii* (Smith's whitlow grass) © Sara Brinton; *Physaria rollinsii* (Rollins' twinpod) © Steve O'Kane. Photos from the CNHP website, with permission

◀ Jennifer Neale discussed ongoing rare plant conservation efforts at DBG, including demographic monitoring, population genomics, restoration efforts, ex situ seed collections, and alpine climate-related research. Jennifer Ackerfield, with assistance from Sami Naibauer (population genetics lab coordinator and field botanist at the University of Northern Colorado's (UNC's) School of Biological Sciences), updated the group on a collaborative effort to elucidate the taxonomic status of a plant referred to as *Physaria* X 1, a suspected hybrid of Bell's twinpod (*Physaria bellii*) and fiddleleaf twinpod (*Physaria vitulifera*). The suspected hybrid has now been determined to be within the species concept of *Physaria vitulifera*. Jennifer Ackerfield also updated the group on field-based floristic research she recently conducted with Alissa Iverson, DBG floristics coordinator, and Dina Clark, University of Colorado Museum of Natural History (COLO) Herbarium.

Mit McGlaughlin, UNC professor and chair of the Department of Biological Sciences, provided conservation recommendations for three rare plants that his population genetics lab has been studying. These were *Erythranthe gemmipara* (Rocky Mountain monkeyflower), *Penstemon acaulis* (stemless beardtongue), and *Penstemon yampaensis* (Yampa beardtongue). Concerns were raised about the lack of genetic diversity in Rocky Mountain monkeyflowers; the study found 33 total genetic individuals for the entire species. Results from the study of the penstemons indicate that the range of the Yampa beardtongue extends into northeastern Utah, and one recent hybrid between the two species was found.

Next, Dina Clark, curator of the COLO Herbarium, provided information on select Colorado plants occurring in Southeastern Colorado that are considered "peripheral species" because they occur at the edge of the species' range. Dina highlighted eight taxa, including a discussion of biological and ecological factors that may contribute to these species

occurring in Colorado. Dina also discussed the value of herbarium specimens in providing guidance on where to look for occurrences of these and other species in Colorado, and the need to review type specimens to confirm identification of "peripheral" or otherwise challenging taxa.

Jake Gottschalk, USFWS biologist with the Colorado Ecological Services Field Office in Grand Junction, reviewed the USFWS's mission and reminded the group that the USFWS administers the Endangered Species Act, which is accomplished with the help of partners. Colorado harbors 16 USFWS-listed plant taxa, most of which exhibit narrow endemism with an affinity for exposed soil types and/or places with arid or semi-arid climates. Jake updated the group on the service's current work, including evaluation of a proposed delisting, ongoing Species Status Assessments (SSA), a five-year review, and developing a recovery plan.

After a break, author and botanist/vegetation ecologist [Gwen Kittel](#) introduced her new book entitled *Willows (Salix) of Colorado: Their Ecology & Identification*. She detailed the contents of the book and how to use it.

The final section of the symposium included updates from CNHP's Jessica Smith, who reviewed some of the publicly available tools and resources provided on the CNHP website, including the Colorado Rare Plant Guide, the Colorado Conservation Data Explorer (CODEX), and the Colorado Floristic Quality Assessment Species List. CNHP welcomes feedback and input on these tools, especially the submission of photos that could be added to the Rare Plant Guide. CNHP Botanist Georgia Doyle presented an update on the CNHP Tracking List, including those taxa added and those removed from the list. Doyle also made a call for rare plant data submissions and reviewed options for contributing data to CNHP via the online submission form and/or the CNHP Project on iNaturalist. Last, Jessica led a wrap-up session in which the group discussed insights from the meeting. 🌀



Additional plants discussed at the 2023 Rare Plant Symposium. From left: *Neoparrya lithophila* (Rock-loving neoparrya) © Jim McCain; *Erythranthe gemmipara* (Rocky Mountain monkeyflower) © Susan Spackman Panjabi; *Salix arizonica* (Arizona willow) © Gwen Kittel (<https://www.gwenkittel.com/>); CNAP.

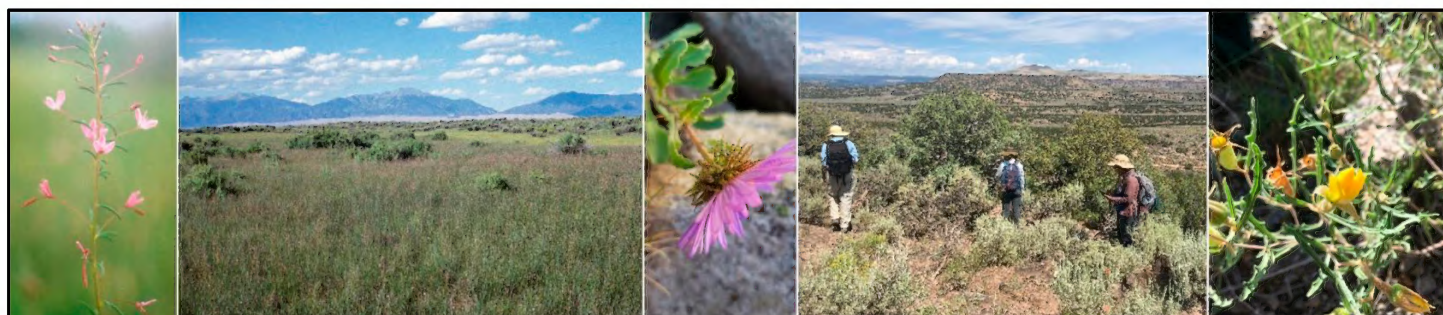
Table 1. Plant Species Reviewed at the Twentieth Annual Rare Plant Symposium, 2023.

Scientific Name	State Common Name	G Rank ¹	S Rank ¹	SWAP ²	USFS/BLM ³
<i>Apios americana</i>	American groundnut	G5	S1		
<i>Artemisia parryi</i> (<i>Artemisia laciniata</i> ssp. <i>parryi</i>)	Parry's wormwood	GNRT3	S2		
<i>Astragalus anisus</i>	Gunnison milkvetch	G3	S3	Tier 2	BLM
<i>Astragalus brandegeei</i>	Brandegee's milkvetch	G3G4	S2		
<i>Astragalus missouriensis</i> var. <i>humistratus</i>	Missouri milkvetch	G5T2	S2	Tier 2	USFS
<i>Astragalus ripleyi</i>	Ripley's milkvetch	G3	S2		BLM/USFS
<i>Castilleja lineata</i>	Marsh-meadow Indian paintbrush	G4?	S2		
<i>Cirsium culebraense</i>	Culebra thistle	G2	S2		
<i>Cleomella multicaulis</i>	Slender spiderflower	G2G3	S2S3	Tier 2	BLM
<i>Descurainia kenheilli</i>	Heil's tansy mustard	G2	S2	Tier 1	
<i>Draba malpighiacea</i>	Malpighiaceae draba	G1?	S1?	Tier 1	
<i>Draba smithii</i>	Smith's whitlowgrass	G3	S3	Tier 2	USFS
<i>Hackelia besseyi</i>	Bessey's stickseed	G2G3	S2		
<i>Neoparrya lithophila</i>	Rock-loving neoparrya	G3	S3		BLM/USFS
<i>Oreocarya pustulosa</i> (<i>Cryptantha cinerea</i> var. <i>pustulosa</i>)	San Juan cat's-eye	G5TNR	S1		
<i>Oreocarya weberi</i> (<i>Cryptantha weberi</i>)	Weber's cat's-eye	G3	S3		
<i>Penstemon bleaklyi</i>	Bleakly's penstemon	G1	S1		
<i>Physaria rollinsii</i>	Rollins' twinpod	G2	S2	Tier 1	
<i>Salix arizonica</i>	Arizona willow	G2G3	S1	Tier 2	USFS

1: G rank is the global imperilment rank; S rank is the state imperilment rank; T = infraspecific taxon rank (subspecies or variety); 1 = critically imperiled; 2 = imperiled; 3 = vulnerable; 4 = apparently secure; 5 = secure

2: SWAP = Colorado State Wildlife Action Plan, Plant of Greatest Conservation Need Rank

3: USFS/BLM: USFS = US Forest Service sensitive species; BLM = Bureau of Land Management Special Status Species



Compilation of photos from south-central Colorado. From left: *Cleomella multicaulis* (slender spiderflower); San Luis Valley habitat; *Xanthisma coloradoense* (Colorado tansyaster); the Colorado Natural Heritage Program Botany and Vegetation Ecology Team on survey; *Mentzelia speciosa* (jeweled blazingstar). © CNAP

Featured Story

The 2023 CoNPS Annual Conference: Flora of the San Luis Valley: History, Culture, and Science

Introduction to the Conference

By Maggie Gaddis, CoNPS Executive Director

Not far from the majestic Blanca Peak and Great Sand Dunes National Park, Adams State University provided the backdrop for our 2023 CoNPS Annual Conference. The annual conference is the one event each year where our statewide membership convenes in one large gathering. This year, speakers addressed the history, culture, and science of the San Luis Valley, the largest high-elevation valley in the world, before more than 150 member participants. Insights from indigenous leaders and local scientists were the highlights of the day.

In addition, longtime CoNPS member and volunteer, Mo Ewing, was presented with a lifetime achievement award during the conference.

Below are summary reports of the presentations and field trips.

Maggie Gaddis, PhD, is the executive director of the Colorado Native Plant Society and a member of the Geography and Environmental Studies faculty at the



Mo Ewing and his lifetime achievement award.
© Loraine Yeatts.

University of Colorado, Colorado Springs. Maggie is a restoration ecologist, whose focus includes grassland and riparian revegetation, native plant propagation, and citizen science engagement. Maggie lives in Colorado Springs, where she was the Southeast Chapter chair before becoming the executive director of CoNPS.

Ethnobotany in the San Luis Valley

Presented by Kristy Duran

Reported by Nan H. Cole

Dr. Kristy Duran's presentation on the ethnobotany of Colorado's San Luis Valley set the stage for the day's many-faceted review of this unique south-central Colorado area.

The valley spreads from Del Norte on the west to Fort Garland and San Luis on the east, and from Villa Grove on the north all the way down and across the New Mexico state line to the south. Roughly about the size of Connecticut, this area now contains six counties and portions of three others, with the Rio Grande River system draining the valley. Flanked by the San Juan Mountains on the west and the Sangre de Cristo Range on much of the east, it is the highest-elevation valley in the world and highest mountain desert in North America, with an average elevation of 7,000 feet on the valley floor. The Valley also contains the tallest sand dunes in North America. These diverse geographic features support a variety of habitats and rich diversity of plants.

Ethnically, the original peoples living in the Valley were American Indians, followed by Hispanic settlers filtering in from New Mexico. After the acquisition of the Valley by the US after the Mexican-American War, Anglo settlers entered the area to mine, ranch, and begin irrigated farming. In 1868, the Utes were removed to reservations further west, but much of their knowledge of plant usage was by then absorbed by the Hispanic settlers. Over time, three major languages had come to name the flora and fauna of the Valley: Ute, Spanish, and English.

Showing a block diagram of the valley's elevation zones, Duran discussed the plains (3,900–6,000 feet), foothills (6,000–8,000 feet), montane (8,000–10,000 feet), subalpine (10,000–11,500 feet), and alpine (higher than 11,500 feet) zones. She described the ecosystem communities within these generalized areas and provided common plant examples for each that were of primary importance to both indigenous and Hispanic peoples, giving scientific nomenclature, plus Ute and Spanish names, where known. ►



Map of the San Luis Valley. From NASA's Visible Earth (<https://visibleearth.nasa.gov/images/57036/colorado>).

◀ The center portion of the San Luis Valley consists of plains, which are composed of wetlands/riparian areas, grasslands, and shrublands. In part of the north, where the runoff from the mountains has no surface drainage, rain soaks into the valley floor, charging the groundwater and giving rise to lakes and wetlands. Typical trees are lanceleaf and narrowleaf cottonwoods (“alamo”) and willows (“jarita”). *Typha latifolia* (cattails) and *Equisetum* sp. (horsetails) are also common here, as is *Asclepias* sp. (milkweed).

Native grasses thrive in the Valley’s flatlands, which were formed by meandering streams. Finally, shrubland communities include *Sarcobatus vermiculatus* (greasewood), *Artemisia tridentata* (sagebrush), *Chrysothamnus* sp. (“chamiso hediondo” or rabbitbrush), *Atriplex* sp. (saltbush), and *Gutierrezia sarothrae* (“escuela de vibora” or snakeweed). Many of these shrubs were used medicinally.

A poster-child plant for the foothills surrounding the valley floor is the *Piñon edulis* (piñon pine) with its edible nuts, resin (“trementina”), and needles containing several vitamins. Other plants typical in this zone are *Mirabilis multiflora* (desert four o’clock, or “maravilla”), *Cercocarpus montanus* (mountain mahogany), and *Symphoricarpos* sp. (snowberry).

Moving up in elevation to the montane zone, *Pinus ponderosa* (ponderosa pine) is a keystone species, its strength symbolizing energy and sustenance to the Utes. Beneath it is found *Rosa woodsii* (Woods’ rose or “rosa de castilla”), used as an eyewash and for cold sores; its fruits (hips or “champes”) are edible when dried, smoked, or jellied. Another useful plant found

here is *Achillea millefolium* (native yarrow or “plumajillo”), whose leaves can be applied to stop bleeding.

The subalpine is dominated by firs, spruces, and aspens. *Castilleja* sp. (paintbrush), *Lupinus* sp. (lupine), and *Ligusticum porteri* (“oshá” or lovage)—highly valued for its medicinal properties—all grow here too.

Kristy L. Duran, PhD, a sixth-generation native of the San Luis Valley, is the faculty director of undergraduate research and professor of biology at Metropolitan State University of Denver, where she is dedicated to equity, inclusion, and student success. Previously, she worked with the CSU Extension Office to help create the Ute Ethnobotany Garden when she was at Colorado Mesa University at Grand Junction, and she pursued her interest in ethnobotany when at Adams State University. She has recently written a chapter on the ethnobotany of the San Luis Valley for *The Geology, Ecology and Human History of the San Luis Valley*. 2020. Beeton JM, Saenz CN, and Waddell BJ, eds. University Press of Colorado.

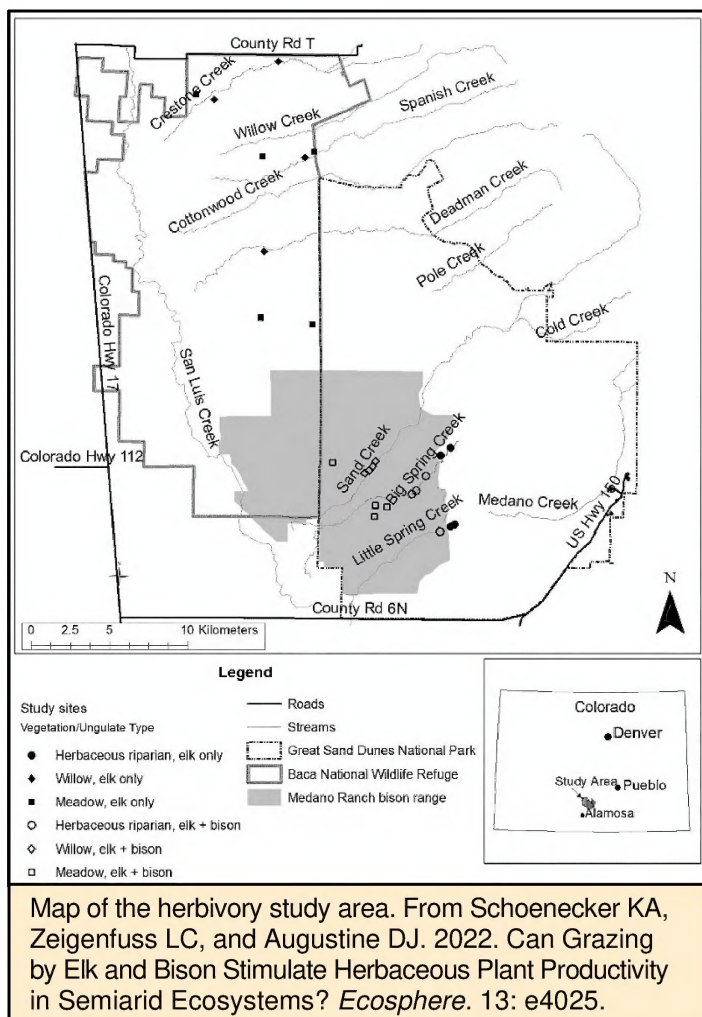
Herbivory Responses to Grazing

Presented by Kate Schoenecker

Reported by Kelly Ambler

Dr. Kate Schoenecker presented the results of her studies on the plant responses to bison and elk grazing. Her primary question: How do plants compensate for leaf removal due to herbivory? Since plants and grazers coevolved over the last 20 million years, it has been hypothesized that plants have developed mechanisms to adapt to the damage incurred by herbivory. These studies were performed near the Great Sand Dunes National Park and Preserve in the San Luis Valley between 2006 and 2008. Herbaceous productivity was measured in meadows, willow-associated areas, and herbaceous riparian plant communities, comparing grazed areas to fenced areas, which excluded bison and elk. Grazing by large ungulates increased herbaceous production, particularly in the herbaceous riparian communities, although the willow-dominated communities also showed increased plant productivity in response to grazing. Interestingly, patchy grazing intensity leads to increased biodiversity, reflecting how different organisms rely on different types of herbaceous cover. These results are similar to those obtained in other steppe systems, such as in Africa and in Yellowstone National Park. Future studies need to be directed toward understanding the impact of herbivory on drier plant communities, such as sagebrush/greasewood habitats.

Kate Schoenecker, PhD, has been studying the ecology of ungulates for 25 years as a research wildlife biologist at the USGS Fort Collins Science Center. She now leads the ungulate ecology research team there, focusing on science to support bison conservation and wild horse and burro research across the west. She received her master’s degree from the University of Arizona, Tucson, studying ►



◀ desert bighorn sheep, and her PhD from Colorado State University, where she studied bison and elk grazing ecology in the Great Sand Dunes National Park and Reserve, and in the Baca National Wildlife Refuge ecosystem.

Flora of the San Luis Valley

Presented by Mat Sharples
Reported by Kelly Ambler

Dr. Mat Sharples gave an interesting overview of the flora in the mountains surrounding the San Luis Valley. In particular, he compared the flora of the southern San Juan Mountains with that of the northern-end Sangre de Cristo Range, both of which have been extensively surveyed. Superficially, the two areas appear quite similar—both are at similar latitudes, rise about 6,000 feet above the surrounding plains, and reach similar maximum elevations. However, there are some surprising differences between the floras of these two mountain ranges. The flora of the Sangres appears to be more influenced by the plains, while the plants of the South San Juans are generally more cold-tolerant and prefer wetter conditions. These differences can be partly explained by the climatic differences between the two ranges. However, it appears that there has not been much migration of some species across the San Luis Valley.

Mat also reported on the floristic surveys performed by Adams State University students around Alamosa. During these surveys, the students learn how to run survey transects, identify and count plant species, prepare quality herbarium samples, and appreciate the impact of restoration techniques on habitat quality. Several new county records have been reported, which probably reflects the sparseness of botanical surveys in the Valley floor. Mat ended his presentation by emphasizing the importance of the Adams State University Herbarium (ALAM) in sustaining a record of local botanical knowledge.

Mat Sharples, PhD, grew up in a dilapidated inner-city area of Massachusetts and realized, with a car at the age of 16, that there was much nature beyond those grim surroundings. After graduating from University of Massachusetts Dartmouth with a BA in English in 2008, Mat explored many of the long-distance trail systems of the western United States. That formative summer helped inspire Mat to make a paradigm shift toward natural history and he enrolled in a PhD program with Dr. Erin Tripp at CU Boulder in 2013. Mat went on to floristic efforts in Colorado and Nevada to understand the systematic biology, trait evolution, and biogeography of the Caryophyllaceae family, and continues to actively work in these systems as the relatively new assistant professor of botany and curator of the Adams State University Herbarium.

Sunflower Adaptation and Divergence in Great Sand Dunes

Presented by Peter Innes
Reported by Stephen Stern

Peter Innes, a PhD candidate at University of Colorado Boulder, presented work from his dissertation research on the amazing adaptations of sunflowers in the Great Sand Dunes ecosystem. The Sand Dunes are a harsh environment, and plants must cope with wind, high temperatures, low nutrients, and many other factors. Sunflowers in the dunes show morphological differences from other sunflower species, and Peter described past work to better understand the identity of these plants. They are most similar to prairie sunflowers (*Helianthus petiolaris* ssp. *fallax*), although they do have some genetic similarities to other sunflowers.

The dunes sunflower has morphological traits that are believed to be adaptations to harsh dune life. The seeds are twice as large as nearby non-dune populations, and the plants are generally more robust. These differences are consistent despite proximity to non-dune sunflower populations. Given the likely interbreeding, how do these ecotypes remain separate? Peter posited that strong selection pressure from the dune ecosystem is driving these morphological differences. ►



Helianthus petiolaris ssp. *fallax* (prairie sunflower) at Great Sand Dunes National Park. © Matt Langemeier

◀ Most of Peter's research has been on gene expression and how it influences the phenotypes, or physical properties, of the sunflowers on the dunes. Even though every cell has the same genetic material, how the genes are expressed can greatly influence the phenotype. In particular, Peter has looked extensively at alternative splicing, which is using the same gene to produce different proteins by changing which parts of the gene are included in the mature protein.

To look at differential gene expression, Peter took seeds from dune and non-dune sunflowers and grew them in a greenhouse under identical conditions. He measured the traits of the plants and then looked at the RNA to see which genes were being expressed in the plants. By comparing the gene expression, he could see which genes are significantly different on and off the dunes. What he found is that gene expression in the dune plants is consistently different from that of plants growing off the dunes. He gave examples of genes that are differentially expressed, such as genes impacting the response to water deprivation and nutrient assimilation. He also found differential splicing, such as in genes responsible for embryo development and nitrogen assimilation. One gene, GLH17, is important in lateral root development, which may contribute to the survival of the sunflowers in the unstable sands of the dunes.

The talk was a fascinating look at evolution in action! These sunflowers are adapting to the harsh environment of the dunes, and Peter has worked out many of the specifics of how they are achieving this success. Despite similar genetics, the dunes plants can survive the harsh environment by differentially expressing genes. As to whether the dunes sunflower is a different species, it is similar enough to non-dune plants that researchers are not inclined to call it a new species. However, Peter noted "check back in 10,000 years or so." In that time, perhaps the strong selection of the dunes will cause these two plant populations to be sufficiently distinct.

*Peter Innes is a PhD candidate in the Ecology and Evolutionary Biology Department at CU Boulder, in the Nolan Kane Lab. He studies evolutionary genomics of crop wild relatives, including sunflower (*Helianthus* spp.) and blue flax (e.g., *Linum lewisii*). Before graduate school, Peter worked as a summer research technician and winter caretaker at the Rocky Mountain Biological Laboratory outside of Crested Butte, Colorado. Learn more about his work at @peter_innes1 or www.peterinnes.org.*

The Taste of Change: How Chokecherry Jelly Sculpted My Horticultural Mindset

Presented by Alex Crochet

Reported by Nan H. Cole

Since toddlerhood, Alex Crochet had followed his grandmother around on her outdoor chores, becoming familiar with what grows where and what can be used for jelly making. He recalled the formative moment during his childhood in the San Luis Valley when he first climbed an apple tree to spot chokecherries during a foraging adventure. Chokecherries (*Prunus virginiana*) have since figured in many of his job locations.

After buying seeds and taking cuttings for traditional cityscape annuals in his first year as horticulture director for the city of Colorado Springs, Alex turned to native collections. For soil, he incorporated composted annual plants into heavily graveled soil blocks, which were then used to grow the native plants—about 3,000 in 2021, 8,000 in 2022, and over 10,000 plants in 2023, 1,000 of which were donated at CoNPS events, including the Annual Conference. For riparian revegetation projects, his crew concentrated on *Salix* (willows), *Carex* (sedges), *Juncus* (rushes), and *Sagittaria* (arrowhead) species, mimicking nature as closely as possible in the greenhouse. The best success was achieved with deep pots.

In addition to plants for pond and creek areas, Alex's crew began adding native plants to medians, municipal buildings, and community centers, choosing natives that withstood those locales best and that could also be propagated in the aggregate soil mix that the horticulture crew had developed. ►



Native plant propagation. © Alex Crochet

◀ By 2023, the crew had settled on a cost-effective process: germinate plants in the very large greenhouse they had acquired, place them outside for the first season, give protection for the first winter, then move them into cold frames in early spring for the second season before transplanting. Their goal was to focus on plants that would provide big visual impacts soon after transplantation. They learned that plants grown from seed, using overwinter stratification, were sturdier than cuttings. Alex's crew of three (Jason Kolm, Kevin Wood, and Kendra Charron) and lots of volunteers, collected seeds, recycled all plastic, and planted natives on east-side plant plots where they became somewhat hail-resistant. Saving the city money on materials and water earned the horticulture department the support it needed to continue developing its successful program of native plants within city boundaries.

Alex Crochet has had a rich, multilayered career path working for the Colorado State Forest Service, on a ranch in Durango, as the habitat creator for the Cheyenne Mountain Zoo, and now as the horticulture director for the city of Colorado Springs. In addition to a career directing the city's horticulture group, Alex is the CoNPS vice-president and serves on the Horticulture Committee. He gardens at home and paints when there's time. He lives in Colorado Springs with his puppy, Samich.

Plants and Plant Use of the Navajo Nation

Presented by Arnold Clifford
Reported by Dale Brown

Arnold Clifford lives on the Navajo Reservation in northwest New Mexico near Beclabito. Shiprock and the San Juan River are to the east, and the Carrizo Mountains of Arizona are nearby to the west. This

area includes a wide range of geographies and habitats, including red-rock desert, sandstone benches, piñon-juniper uplands, canyon cliffs and riparian areas, and montane forest.

Arnold described his major effort, which is to produce an herbarium and flora of Dinétah, the traditional homeland of the Navajo Nation, including its ethnobotany. His floristic approach relies on standard morphologic taxonomy. He has assembled a plant collection including some 30,000 specimens. He has gathered these over years of his own collecting, and has also received contributions from individual botanists, including Loraine Yeatts of CoNPS, as well as institutions including the University of New Mexico and Northern Arizona University.

Clifford discussed his own history with native plants, and indigenous approaches to plant collection. His early experience with native plants came with his grandmother, who prepared dyes made from native plants for weaving Navajo rugs. Clifford explained that sheep raising and wool weaving among Navajos and other southwestern tribal peoples arose from contact with Europeans beginning circa 1540. However, the patterns of Navajo rugs recapitulate themes of traditional sand painting, a much older art form.

In contrast to Western scientific methods, as Clifford explained, the indigenous approach to plant collection—whether for curation and study or for traditional ethnobotanic uses—is deeply grounded in recognizing the spiritual connection between the plant and the human user, mediated by the holy spirit.

This spiritual worldview connecting humans with plants can be seen in many different aspects of Navajo culture and ethnobotany. Some examples:

In connections with the natural world:

- Turkey is the guardian of domestic plants. Turkey brought seeds of the “four sisters”—corn, bean, squash, and tobacco—from the underworld.
- The myth of whirling logs (symbolized by a shape similar to a hooked cross or reverse svastika) represents the gods' protection and sharing knowledge with humans, including teachings of seeds and farming.
- The hunchback god (ya'ackidi', in western culture the watersprinkler) is the deity of native plants. His backpack is filled with precipitation (snow and rain) to nurture the plants.
- Owl goes out at night, making earth happy.

In healing, some 300–400 plant species have medicinal properties:

- The sacred Night Way chant, a healing ceremony, includes creation of sand paintings representing the Four Sacred Plants: cedar, sage, sweetgrass, and tobacco. ►



Map of the Four Corners region. From Meadow A, Ferguson D, and Crimmins M. 2012. Helping a Community Develop a Drought Impacts Reporting System. *Rural Connections*. 7.

- ◀ • The Restoration Rite of Rain Boy is a healing ceremony of Life Way medicine. According to myth, different plants are assigned to healing different body parts.

In the next section of his presentation, Mr. Clifford presented a compendium of native plants with ethnobotanic uses, divided into the broad categories of edible, utilitarian, medicinal, ceremonial, and spiritual protection. Examples of plants and some of their uses follow.

Edible plants: *Thelesperma megapotamicum* (Navajo tea), *Cymopterus bulbosus* (spring parsley), *Allium macropetalum* (San Juan onion), *Atriplex saccaria* (sack saltbush), *Cleomella lutea* (yellow bee plant), *Calochortus aureus* (golden mariposa lily), *Rhus trilobata* (three-leaf sumac; non-food uses also), *Eriocoma hymenoides* (Indian ricegrass), *Opuntia phaeacantha* (Engelmann's prickly pear), *Sclerocactus cloverae* (Clover's hardwall cactus).

Utilitarian plants: *Senecio flaccidus* (threeleaf ragwort, cactus cleaner), *Yucca baileyi* (Bailey's yucca), *Yucca baccata* (Spanish bayonet), *Juniperus osteosperma* (Utah juniper), *Pinus edulis* (piñon pine), *Atriplex canescens* (fourwing saltbush, greasewood), *Rumex hymenosepalus* (wild rhubarb).

Medicinal plants: *Eriogonum alatum* (winged buckwheat), *Asclepias asperula* (spider milkweed, emetic), *Dieteria canescens* (hoary aster), *Populus tremuloides* (quaking aspen), *Oenothera caespitosa* (tufted evening primrose), *Sphaeralcea fendleri* (Fendlers' globemallow). The non-native *Verbascum thapsus* (woolly mullein) is also used medicinally.

Ceremonial plants: *Erigeron bistiensis* (Bisti fleabane), *Townsendia incana* (hoary Townsend-daisy), *Lycium pallidum* (pale wolfberry), *Rosa woodsii* (Woods' rose), *Cirsium chellyense* (Navajo thistle), *Datura wrightii* (Jimsonweed), *Gutierrezia sarothrae* (snakeweed), *Krascheninnikovia lanata* (winterfat).

Spiritual protection plants: *Eriogonum wetherillii* (Wetherill's buckwheat), *Aliciella cliffordii* (Clifford's Beauty Way tobacco), *Arctostaphylos* sp. (manzanita).

In conclusion, Mr. Clifford emphasized the importance of lifelong learning and sharing knowledge with others, especially younger generations. In his view, traditional knowledge is meant to be shared, not kept secret among select practitioners. Much traditional knowledge of native plants as well as important ceremonial practices are being lost as native peoples become more focused on modern society. He cited Alice Izii as an important early Native American ethnobotanist who preserved much traditional knowledge. Finally, he paid loving tribute to his student Jessie Orozco, who was dedicated to learning Navajo traditions but sadly died far too young.

Arnold Clifford is a geologist, botanist, ethnobotanist, and an authority on Navajo history and culture. Arnold started studying plants at the age of 10 years. His maternal grandmother, Sarah Charley, was instrumental in teaching Arnold his first lessons in Navajo ethnobotany. For the past 35 years, Arnold has been collecting and documenting the flora of the southwestern province of the United States, from the high alpine of southwestern Colorado to the lowland deserts of Arizona, New Mexico, Utah, and parts of Nevada and California. Arnold maintains his own personal collection at the Carrizo Mountain Environmental & Herbarium, Inc., where there are about 30,000 plant specimens stored. His collection includes many rare plants of the Southwest, including about 35 new species he has discovered, 15 of which have been described and published, with 20 specimens still in need of describing, naming, and publishing. Arnold is also coeditor of the Flora of the Four Corners Region, a flora of vascular plants of the San Juan River drainage basin (Missouri Botanic Garden Press, 2013). He named a new buckwheat after his grandmother, Eriogonum lachnogynum var. sarahiae N.D. Atwood & A. Clifford. Arnold is now putting together a flora and geology of the Navajo Indian Reservation. He is also trying to get his herbarium registered so that it can be recognized nationwide and internationally.

Navajo Dyes Workshop

Led by Arnold Clifford
Reported by David Anderson

We had an amazing time learning about dying wool from Arnold Clifford. We spent Sunday morning with him in the courtyard of Richardson Hall, Adams State University. Arnold grew up on the Navajo reservation in the Carrizo Mountains. He learned about dying wool ►



Dyeing wool skeins with Arnold Clifford at the 2023 CoNPS Annual Conference. © Pat Cooper

◀ and weaving rugs from his grandmother, who was a renowned weaver. He told us about the different patterns in traditional and modern Navajo weaving, and their meanings in the cosmology of the Navajo.

Arnold brought native plants to make four different dyes with us: *Thelesperma megapotamicum* (threadleaf, Navajo tea), *Rumex hymenosepalus* (a native dock of the Navajo reservation), *Ericameria nauseosa* (rabbitbrush), and *Opuntia* (prickly pear) fruits, plus *Helianthus annuus* (common sunflower).

We learned about the mordants—agents that help fix the dye to the wool—that are soaked with the plants for a few days first, which could be kaolinite clay, copper ore, malachite, or azurite. Even some rusty nails can work as mordants! Different mordants soaked with the same plant will result in different colored dyes.

CoNPS donated camp stoves for the demonstration and to Arnold as a gift for his service. We used these to boil the mixtures of the plants, mordants, and water.

Arnold brought wool yarn, which our crew worked on to make the skeins that we soaked in the dye. It was fun to hang out with Arnold and other participants while the wool boiled in the dye, and a great opportunity to reconnect or get to know one another!

We were amazed at the colors—the wool skeins came out beautifully.

What a rare treat to learn about this from an expert and to participate in making the dye and using it to dye wool. Each of us got to take home skeins of the dyed wool. Who knows—maybe you'll see something in next year's silent auction that our crew makes from these; there was talk of crocheting with the wool!

Alamosa National Wildlife Refuge Restoration Project Field Trip

Led by Suzanne Beauchaine

Reported by Lynn Cudlip

If you work with a toolbox the size of Suzanne Beauchaine's toolbox at the Alamosa National Wildlife Refuge, you might think twice about beginning new projects. As part of the field trips for the 2023 CoNPS annual conference, two of us followed Suzanne to several sites within the wildlife refuge to view various restoration projects. We found out that, with limited and tightly controlled water quantity in the Rio Grande, initiating and maintaining willow restoration projects is a challenge. Suzanne mentioned that while the Rio Grande at Del Norte (upstream of the refuge) can run up to 4,000 cubic feet per second (cfs), the refuge may only receive 70 cfs at certain times. In order to connect these areas to the existing floodplain, that's not enough water.

However, Suzanne, along with her contractors, has been able to do just that at the Chicago Ditch fishing access site. They planted coyote *Salix exigua* (sandbar willow) root bundles to rework and stabilize the eroded stream bank. Across the river to the northwest is the Malm Trail, which courses through several partners' lands. Restoration here, as with other sites in the refuge, targets habitat improvement for the *Empidonax traillii extimus*, or southwestern willow flycatcher. ►



The Rio Grande at the northwestern edge of the Alamosa National Wildlife Refuge. © Lynn Cudlip

◀ Any woody restoration project can attract critters who benefit from the restoration efforts. While beavers are important to the refuge's systems, they do eat the willows and cottonwoods that Suzanne is trying to maintain. In an area where the willows and cottonwoods were wrapped with wire fence, we witnessed several fall-senescent plants; however, outside of those restraints, we saw flourishing ones. Go figure. We also learned that identifying the willows on the refuge is difficult. Some of the species we saw were *Salix eriocephala* ssp. *mackenzieana* var. *ligulifolia* (strapleaf willow), *S. amygdaloides* (peach-leaf willow), *S. fragilis* (crack willow), and *S. exigua* (coyote willow), and I am so glad that I now have *Willows (Salix) of Colorado: Their Ecology & Identification* (Kittel 2023) for future trips to the refuge! We thank Suzanne Beauchaine for providing us with a great tour and an understanding of the difficulties in restoring and maintaining riparian and wetland habitat where a river is impaired.

Kittel G. 2023. *Willows (Salix) of Colorado: Their Ecology & Identification*. Lulu. <https://www.gwenkittel.com/>

Field Trip to Great Sand Dunes National Park

Led by Peter Innes

Reported by Matt Langemeier

We were fortunate to have great weather for the Great Sand Dunes hike. The morning started out a bit cloudy, with a chill in the air. However, as the day went on, the clouds cleared out and it warmed up nicely. The wind can be strong on the dunes, but while we were out that morning, it stayed calm.

We went out on the sand around 8:30 AM and reached the top of High Dune around 9:50 AM. Most of us needed a few breaks along the way. Hiking in sand is hard! I think most of us were surprised by the number

of insects we saw on the dunes on the way up—lots of lady beetles and boxelder bugs, and at least a few bright green carapaces from other unknown insects.

The flowers were just a short distance down the other side of High Dune, so we started botanizing just a few minutes after heading down from the “peak.” The *Eriocoma hymenoides* (Indian ricegrass), of course, wasn't in bloom; however, all of the other plants mentioned in this article were. One participant wisely brought her *Flora of Colorado, Second Edition* (Ackerfield, 2022) along to help with the identifications.

Since it was so late in the season, there was some concern that the sunflowers would be done blooming. We were lucky to find at least a few plants still in bloom (see photo on page 10). And we were able to find plenty of sunflower seeds! The long seeds matched up nicely with the ones Peter Innes had shown in his presentation the day before.

Never having botanized in the sand dunes before, I was surprised that we saw anything growing at all. Of special interest to me were *Lygodesmia juncea* (white-flowered rush skeletonweed), which is usually pink, and *Aphyllon ludovicianum* (Louisiana broomrape). Ackerfield (2022) lists host plants for this latter species as “perennial Asteraceae” (*Artemisia*, *Grindelia*, *Heterotheca*), but as far as I could tell, these *A. ludovicianum* were parasitizing the *Lygodesmia*.

Starting back down around 10:45 AM, we saw several more *Helianthus petiolaris* (prairie sunflowers) tucked away among the dunes. Interestingly, as we got closer to the plains, the seeds from the sunflowers got smaller, again in agreement with what Peter had presented. We reached the parking lot by noon. As far as I could tell, a good time was had by all, although a couple of hikers found the hike up to be a bit too strenuous and unfortunately turned back early.

Ackerfield J. 2022. *Flora of Colorado, Second Edition*. BRIT Press.

Russell Lakes State Wildlife Area Field Trip

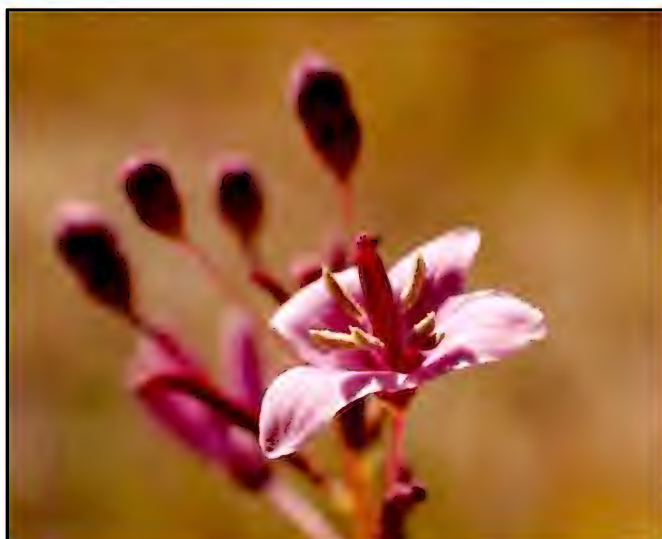
Reported by Kelly Ambler

A small group of us met at Russell Lakes State Wildlife Area to explore an area unlike anything found in the Front Range. We were very fortunate to have several experienced botanists on the trip, including Loraine Yeatts, Stephen Hauptli, Ernie Marx, and Tom Zeiner. Stephen was particularly helpful in identifying the plants in this wetland area.

The Russell Lakes State Wildlife Area was designated as a National Natural Landmark in 1975, as it is one ►



The group on the field trip to the Great Sand Dunes National Park. © Matt Langemeier



Cleomella multicaulis (slender spiderflower) in bloom. © Kelly Ambler

◀ of the largest remaining high-elevation alkaline marshes in the United States. The extensive bulrush marsh supports large numbers of flora and fauna and is an outstanding resting and breeding site for waterfowl. A short gravel-and-boardwalk trail leads to a platform overlooking one of the small lakes.

We were able to identify nearly 50 species of plants, several of which were still blooming. Of particular interest was *Cleomella multicaulis* (slender spiderflower), a rare plant that is restricted to the San Luis Valley. We found a few specimens in bloom and many with seed pods. Another favorite was *Sidalcea neomexicana* (New Mexico checkermallow), with its bright pink flowers. In typical botanical-field-trip fashion, we kept to a heady pace, covering about one mile over five hours.



Sidalcea neomexicana (New Mexico checkermallow) with a bee visitor. © Kelly Ambler

Seed Collection Field Trip

Reported by Maggie Gaddis

CoNPS's collaboration with the Colorado Natural Heritage Program, to develop the Native Plant Materials Program for Region 2 of the US Forest Service, came to a glorious finale during the annual conference on a seed-collection field trip at the Rio Grande National Forest. Eight volunteers collected approximately 2.4 pounds of *Festuca arizonica* (Arizona fescue), as well as the seeds other species, in about three hours. Wearing gloves was helpful, but some preferred collecting with bare hands. We stripped the seed from the stem, using the thumbnail pressed to the forefinger, while collecting mature seeds in the process of shattering. If the seeds did not release easily from the stem, we assumed they were not quite ready. In this case, we clipped the stem below the inflorescence so the stem could provide additional calories while the seed matures and dries out. Each volunteer focused on only one species at a time, although we did collect multiple species.

Seed collection is a unique volunteer activity because it is both a community effort and a peaceful solitary effort. When I looked up from seed collection for a deep breath of crisp mountain air, I saw my compadres in the near distance, but they were a bit too far away for conversation. I listened to an audiobook for awhile; some folks liked podcasts and music; others preferred silence. When my seed-collection wanderings brought me close to another volunteer, we would have light conversation, but we ultimately drifted apart, looking from one plant to the next. I liked to play a game—I looked up and scanned the grasses until I saw my species of interest. I walked purposefully toward that individual. Was I right? There is no better way to really honor and observe a plant. The intentional time focusing on a solitary species feels like the greatest gratitude I can bestow on the native plants I love so much. The seeds are a gift of the land, a gift acknowledging my efforts to restore this great landscape and the plant communities within. And this gift continues to reward my mind. Every species I have collected is one I now feel I know very well.

You, too, can honor the native species by scouting for seed collection sites throughout the winter. Check out the species-of-interest list. Can you find these species on the landscape? In every season? Grasses are easy to see in late fall and winter because they senesce to unique colors and catch the waning southern sun with their feathery hairs. If you find a population of more than 50 individuals of any of these species on Forest Service land, please let us know by emailing ColoradoNativePlantSociety@gmail.com. We traveled 12,000 miles this summer to scout for and collect

“Annual Conference Recap...” continued on page 20 ►

Rediscovering the Type Locality of Colorado's Columbine Flower

By Michael J. Weissmann

Readers of *Aquilegia* are certainly familiar with Colorado's state flower and this journal's namesake, the Rocky Mountain columbine, or *Aquilegia coerulea*, also known as the Colorado blue columbine. The Colorado General Assembly designated it as Colorado's official state flower on April 4, 1899, following a vote taken of schoolchildren statewide. In 1925, the General Assembly passed a law protecting the plants from being uprooted and limiting collecting to no more than 25 stems, blossoms, and buds per day on public lands. Of course, following "Leave No Trace" principles, even the flowers shouldn't be picked.

It is fitting that this plant is a Colorado state symbol: Dr. Edwin James made the first scientific collection of the Rocky Mountain Columbine in Colorado during the Long Expedition in 1820. (For more information about James and his role on the journey, see the four-part series "Celebrating the Bicentennial of Stephen H. Long's Expedition," by Mike Kintgen and Jen Toews in each issue of Volume 44 (2020) of *Aquilegia*).

James gave this plant the scientific name *Aquilegia coerulea*, the Latin *coerulea* (sometimes written as *caerulea*) meaning "sky blue." *Aquilegia* is derived from the Latin *Aquila*, meaning "eagle"—the flowers apparently resembled an eagle's claw to Carl Linnaeus, the taxonomist who earlier described a European species of the same genus.

Edwin James was only 22 years old in 1820 when he joined the mapping and exploring expedition led by Major Stephen Long, the first such survey to employ professional naturalists to collect and describe natural history specimens. James served as the botanist, geologist, and physician during this second year of the journey, collecting many new plant species.

According to his journal, James encountered and collected the Rocky Mountain columbine for the first time on July 10, 1820. The original specimen used to describe the species was deposited at the New York

Botanical Garden collection, now housed in the NYBG's William and Lynda Steere Herbarium. The species was first formally described from this specimen by James in the report of the Long Expedition in 1823.

When a new species is first described scientifically, a specimen is designated as the holotype. This is sometimes the first specimen found for the species, and usually represents well the characteristics that distinguish the new species, making it a "typical" example. The location where the holotype specimen was collected is called the type locality. On the

herbarium specimen label for this holotype, it lists the type locality as "About the higher parts of the Rocky Mountains"—not very precise.

In 2020, the two-hundredth anniversary of the expedition's Colorado travels, we set out to try to find the site where James may have collected this first columbine specimen. According to the records of the official expedition journalist, Captain John R. Bell, the Long Expedition departed early from their camp just west of the base of present-day Dawson Butte on the morning of July 10, 1820, heading south. Early in the morning, the explorers crossed the divide between the watersheds of the Platte and Arkansas Rivers at what is now Palmer Lake. They descended a short way down the creek on the other side before

stopping to rest in the early afternoon. They called the nearby stream "Castle Creek" because of an imposing rock outcrop at their rest stop that they named "Castle Rock." Today this is Monument Creek, and the outcrop is known locally as Elephant Rock. As they rested there, the expedition landscape painter, Samuel Seymour, sketched the outcrop.

Two hundred years later, on that same July day in 2020, we walked into the area north of Monument Creek until we came to a small meadow, presenting us with a view perspective like that found in Seymour's drawing (Figure 3). This was almost ►



Figure 1. Dr. Edwin P. James. From Pammel LH. 1907. "Dr. Edwin James." *The Annals of Iowa* 8:162-185. <https://doi.org/10.17077/0003-4827.3400>



Figure 2. Image of Holotype 00353216 specimen, *Aquilegia coerulea* James, New York Botanical Garden's William and Lynda Steere Herbarium <https://sweetgum.nybg.org/science/vh/specimen-details/?irn=398248>

◀ certainly near where the expedition stopped to rest. Although the rock formation is almost unchanged, the rest of the scene looks very different today, with a forest of ponderosa pine now growing around the base of the formation, obscuring much of the view.

It was during this rest stop that James recorded collecting the holotype specimen of the Rocky Mountain columbine flower. However, an extensive, modern-day search on that hillside resulted in disappointment, with no sign of any columbine flowers. However, many of the other plants observed by James on that day 200 years prior are still common, including *Quercus gambelii* (scrub oak) and *Campanula parryi* (Parry's harebells). Had the habitat changed so much over the two centuries that this common columbine no longer occurred there, or were we in the wrong place?

Had we thought about it more, we would have realized that James would probably not have rested during this more than five-hour break in their travels. That was not his *modus operandi*. Whenever opportunities arose, as others rested, James headed uphill, upstream, and west. In these side trips, he was usually accompanied by other young and restless members of the party, including the expedition's

20-year-old assistant naturalist and artist, Titian Ramsay Peale. The mountains were constantly calling to them, as it was in the foothills, subalpine, and alpine habitats that they were most likely to find new species.

For example, the previous week, on July 5, as the party camped along the South Platte River north of present-day Denver, James, Peale, and two others attempted to reach the base of the mountains by ascending "Cannon-ball Creek" (today known as Clear Creek). They only made it about eight miles upstream (near present-day Inspiration Point), racing back to the camp just before dark. A couple days later as the party remained at camp where the South Platte River exited the foothills (just south of present-day Kassler and Waterton), James, Peale, and two riflemen ascended Sheep Mountain to the point above the river where they could distinguish the two principal branches of the South Platte. Stomachaches caused by eating too many wild currants cut that side trip short, but many plant specimens were collected. Sundays were usually reserved for resting, but on Sunday, July 9, as the expedition camped at the base of Dawson Butte, James and others followed Bear Creek westward into present-day Perry Park, describing the large red sandstone rock formations and a cascade of several hundred feet.

James's proclivity for heading upstream and uphill continued after July 10. While the expedition camped for a few days along Fountain Creek on July 13–15, ►



Figure 3. Top: Elephant Rock—sketch, at top, by Samuel Seymour in 1820. Bottom: Photograph taken in 2020. © Michael J. Weissmann

◀ James, accompanied by soldiers Zachariah Wilson and Joseph Verplank, made the first documented ascent of Pike's Peak, collecting several new species of alpine tundra plants. Finally, on July 17–18, while the main party camped on the banks of the Arkansas River just west of present-day Pueblo, James led a small group on a 66-mile round-trip trek to the entrance of the Royal Gorge. This would be their last opportunity to touch the Rocky Mountains before their descent down the Arkansas and back to the east.

James had clearly demonstrated a habit of taking any opportunity available to ascend higher into the mountains. It is only logical that he would have done so as others of the party rested midday on July 10. With this in mind, we decided to try our luck again this year, on the two-hundred-third anniversary of the flower's discovery. This time, instead of heading toward Elephant Rock, we took the Limbaugh Canyon trail leading to an area upstream on Monument Creek. To our delight, we encountered several columbine flowers in full bloom on a west-facing slope a few yards above the small stream. A large variety of other subalpine wildflowers were also in bloom, which certainly would have been a paradise for a young naturalist from the East intent on collecting new botanical specimens.

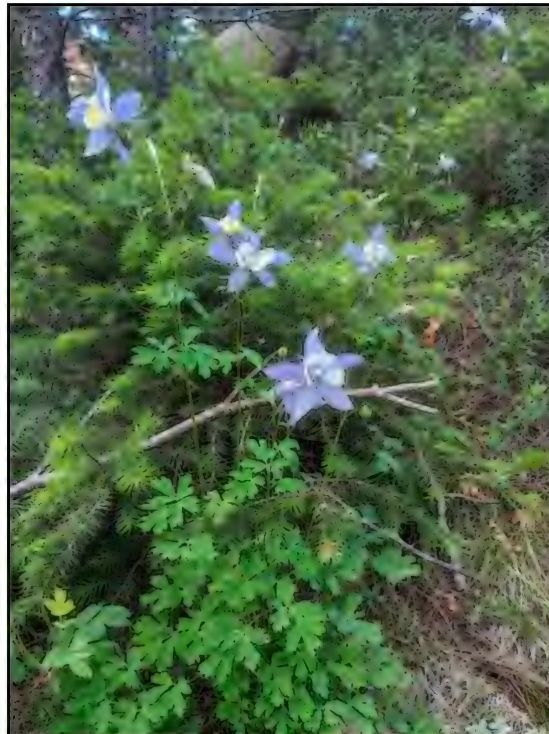
In our opinion, it is highly likely that present-day Limbaugh Canyon is the type locality for the Colorado state flower. We found the columbines to be plentiful less than two miles upstream from where the others of the Long Expedition were resting. Perhaps Edwin James would not recognize the area today, with the town of Palmer Lake spreading up the hill, and the canyon bustling with mountain bikers and hikers. Yet, despite the changes, the Rocky Mountain columbine continues to flourish in the area and will hopefully do so long into the future.

Acknowledgements

The author wishes to thank Gregg and Andrea Girtin, and Rachel Williams, who participated in the initial 2020 hunt for the Columbine's type locality, with Rachel also joining the 2023 expedition. Gregg also suggested Limbaugh Canyon Trail as the best bet for finding an upstream locality. The author is also grateful to the late Dr. Howard Evans, who first sparked his interest in the Long Expedition.

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- Michael Weissmann, PhD, entomologist, was co-founder and former general curator of the Butterfly Pavilion in Westminster, Colorado, and has consulted on several similar facilities worldwide. He has published a variety of technical articles about insect taxonomy, biology, and behavior, and has co-authored popular guides to insects of regional parks and monuments. Current entomological research is focused on mosquitoes, working as chief entomologist at Vector Disease Control International's Denver Laboratory. AskArtie@aol.com 🌀



Columbine flowers on the hill east of Monument Creek in Limbaugh Canyon, July 9, 2023. © Michael J. Weissmann

From Mudslides and Weeds to Prairie: Transforming My Backyard with Native Plants

By Virginia Phillips

My neighbors across the street wanted to sell their home, and my property looked awful. They knew that my many attempts over the years to get anything to grow had failed, and they weren't upset, but I was determined to make this decades-long eyesore go away. So, in the spring of 2022, I renewed my efforts to convert my backyard from mudslides and weeds to native plants and shrubs. At least they could tell prospective buyers it was a work in progress.



Mostly weeds, invasives, and non-native plants in May 2022. © Virginia Phillips

The Challenges

There were several significant challenges, including invasive non-native plants, depleted soil, and erosion, but the biggest challenge was complying with the city's regulation requiring a large section of my property to be a native landscape that supports wildlife without structures like terracing. It needed to be fire-wise, too, which is a rule that only applies to a handful of properties in Colorado Springs. At that time, I felt the requirement significantly limited my ability to get something to grow.

A few years ago, my desperation led to foraging on a vacant lot across the street. With permission, my spouse and I dug up and transplanted about 100 plants onto our property. It was a step in the right direction, but it became clear that we needed thousands of plants for our 16,000-square-foot hillside.

I was downhearted and decided I needed a new approach.

Steps to Success

That's when I decided to educate myself about soils, erosion-mitigation techniques, and native plants. I hoped to learn something that could help me create a habitat, all of which led to an effort to identify everything growing in my yard, to learn what natives were already growing in my neighborhood, and to research what could grow on the harsh, non-irrigated, south-facing slope.

Along the way I created a list of native plants and shrubs considered well-suited for this yard. Before I knew it, I was shopping for native plants at local nurseries, ethically collecting seeds from various sources, attending local swaps, and propagating plants on my own.

This continuous effort helped my backyard become a Colorado short-grass prairie landscape mixed with shrubs. It still needs more plants and time to mature, and a few cultivars still need to be removed, but the rivers of mud don't happen anymore.

Native Habitat Changes

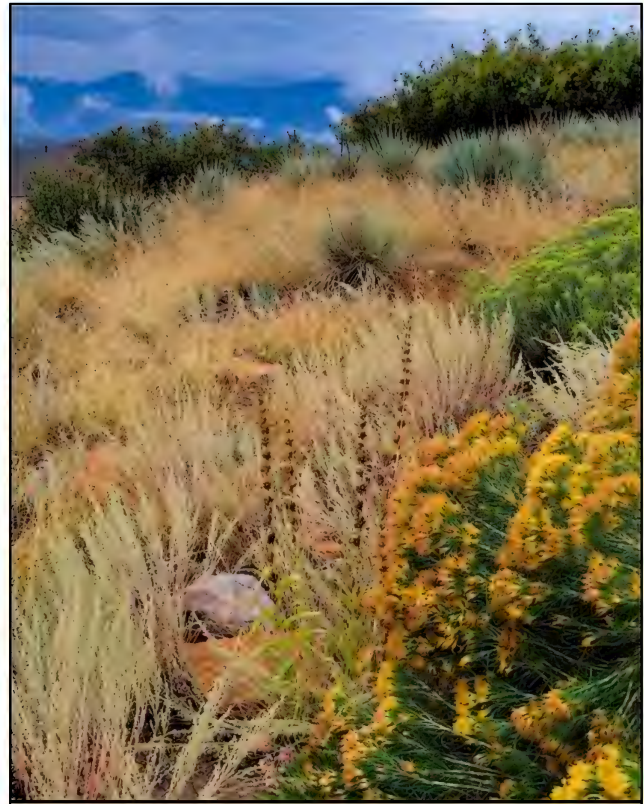
As I look back, I am thankful for the city's regulation, and I can see that my biggest challenge wasn't the condition of the yard, the ordinance, or planting native plants, but rather it was a gap between the know-how I needed and the knowledge I had. ►



Short-grass prairie in July 2023. © Virginia Phillips



Painted lady butterfly on *Penstemon angustifolius* (narrowleaf beardtongue). © Virginia Phillips



Fall colors. © Virginia Phillips

◀ Butterflies and moths flutter from grasses to forbs. Bees sleep in flowers. Fence lizards, garter snakes, robber flies, wolf spiders, and ladybugs patrol the area. Birds forage, find shelter, and sing many songs.

The most surprising thing has been the response and engagement from people who are now inspired and intrigued by the transformation and the native habitat. 🌀



◀ “Annual Conference Recap...” continued from page 15

seed. You can help us lighten our ecological footprint by telling us where the seeds are in your geographic region. We have a blanket permit to collect anywhere on USFS lands, but we need to vet the process, so **no rogue collecting, please!** If you are interested in participating in the Native Plant Materials Program, please join the Restoration Committee by going to <https://conps.org/home-2/about-us/committees/restoration-committee/>

The species targeted for collection are: *Andropogon gerardii* (big bluestem), *Bouteloua gracilis* (blue grama), *Dalea purpurea* (purple prairie clover), *Deschampsia cespitosa* (tufted hairgrass), *Elymus glaucus* (blue wildrye), *Elymus trachycaulus* (slender wheatgrass), *Festuca idahoensis* (Idaho fescue), *Heterotheca villosa* (hairy false goldenaster), *Koeleria macrantha* (Junegrass), *Nassella viridula* (green needlegrass), *Pascopyrum smithii* (western wheatgrass), *Poa secunda* (Sandberg bluegrass),

Pseudoroegneria spicata (bluebunch), *Ratibida columnifera* (prairie coneflower), and *Sporobolus cryptandrus* (sand dropseed). If the opportunity arises, *Penstemon* spp. (penstemon, beardtongue) and *Thermopsis* spp. (golden banner) are also collected. 🌀



The seed collecting group. © Brad Klafehn

A Tale of Two Lilies: Assessing *Calochortus ciscoensis* as a Species Distinct from *Calochortus nuttallii*

By Stephen Stern and Elizabeth Aaron

Introduction

The genus *Calochortus* includes approximately 70 species native to the western United States, Canada, and Mexico. In Colorado, there are three species: *C. flexuosus* S. Watson (winding mariposa lily), found in the southwestern counties; *C. gunnisonii* S. Watson (Gunnison's mariposa lily), which is widespread in the central and western parts of the state; and *C. nuttallii* Torr. & A. Gray (Nuttall's mariposa lily), west of the Continental Divide. *Calochortus nuttallii* is common in the Colorado Plateau and is the state flower of Utah. In fact, bulbs of *C. nuttallii* sustained early Mormon settlers during the famine years between 1853 and 1858 (Muir, 1877). In moist years, the Colorado Plateau deserts can be carpeted by countless blooms of *C. nuttallii*.

In the fourth edition of *A Utah Flora* (2008), Stanley Welsh and Duane Atwood described *Calochortus ciscoensis* S.L. Welsh & N.D. Atwood (Cisco sego lily), splitting it from the widespread *C. nuttallii* (Welsh, 2008). *Calochortus ciscoensis* was distinguished by the pink to lavender-colored petals (versus white in *C. nuttallii*), the absence of a chevron (a V-shaped, dark band at the base of the petals, above the nectary), and the clumped appearance of many stems arising in a cluster. However, the species description noted that there is variability and that some individuals of *C. ciscoensis* may have a chevron and petal color may be white.

Calochortus nuttallii ranges from Arizona and New Mexico northward to Montana and North Dakota. *Calochortus ciscoensis* has a much more restricted distribution in Grand, Uintah, and Duchesne Counties in Utah and was named for the town of Cisco, Utah, near the type collection. Other collections have been made from the vicinity of Arches National Park and along I-70 in Grand County, Utah, and to the north around the town of Vernal, Utah. The easternmost collections of *C. ciscoensis* are just within the Colorado border in Mesa County (Figure 1).

Calochortus ciscoensis has been treated in floras in both Colorado and Utah. *A Utah Flora* has incorporated the species since its description by the authors (Welsh and Atwood, 2008). The first edition of *Flora of Colorado* (Ackerfield, 2015) treated *C. ciscoensis* as a synonym of *C. nuttallii*. The second

edition (Ackerfield, 2022) accepted *C. ciscoensis* as a distinct species and the key distinguished it from *C. nuttallii* by the absence of a chevron (Ackerfield, 2022). However, the description of the species indicates that *C. ciscoensis* has glands "sometimes bordered by a faint crescent-shaped reddish-purple blotch."

Specimens on [SEINet](#) are largely those identified in the original species description with a few additional, more recent collections by Peggy Lyon for the Colorado Natural Heritage Program in the Colorado-Utah border area. Stemming from difficulty in identifying *Calochortus* when conducting a floristic inventory of McInnis Canyons National Conservation Area on the Colorado-Utah border, we investigated the distinctions between *C. ciscoensis* and *C. nuttallii* using both morphological and molecular studies.

Methods

Fieldwork was conducted in 12 locations throughout the range of *C. ciscoensis* as determined by specimens cited in the original species description (Figure 1). Observations and photographs were made in the field on key features previously used to define the species, including the presence/absence of a chevron, the color of the petals, the number of flowers per stem, and whether the petal tips were rounded or acuminate. Since 2023 was an above-average year for precipitation, populations consisted of hundreds to thousands of individuals. In each population, voucher specimens were made that corresponded to the ►

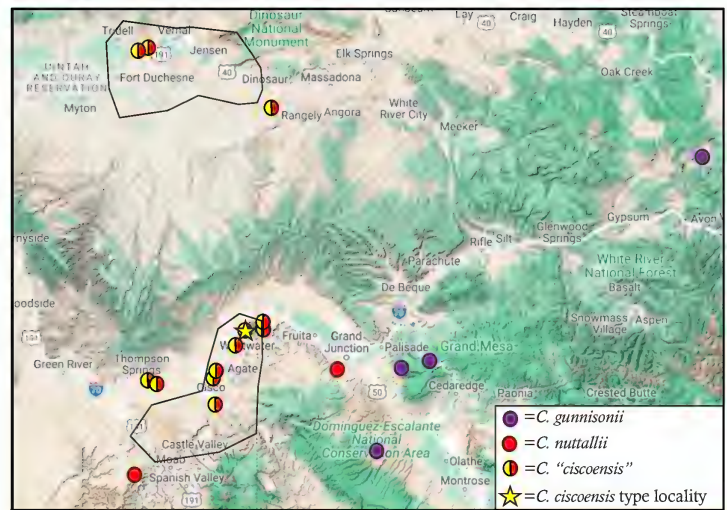


Figure 1: Distribution of *Calochortus ciscoensis* (red highlighted areas) from the species description. Circles indicate collections made for this study.

◀ morphological variation observed. Specimens were added to the Walter Almond Kelley Herbarium at Colorado Mesa University, and data are available online on [SEINet](#).

DNA was extracted from leaf material of vouchered specimens. In addition to *C. ciscoensis*, collections of *C. nuttallii* and *C. gunnisonii* from surrounding locations were added to serve as outgroups in the molecular analysis. Although it has not been widely used in *Calochortus*, we amplified the internal transcribed spacer (ITS) region, given its widespread use as a barcoding gene and its high variability between species. The ITS region was amplified using the protocol outlined in Taberlet et al. (1991). Polymerase chain reaction (PCR) amplification was verified using agarose gel electrophoresis. PCR products were cleaned using GENEWIZ PCR cleanup kit and sent to Azenta/GENEWIZ for Sanger sequencing. Sequences were compiled using Sequencher and aligned in Unipro UGENE (Okonechnikov et al., 2012). One sequence of *C. leichtlinii* (Leichtlin's mariposa), a species from the Sierra Nevada in California, was obtained from GenBank and used as an outgroup. Bayesian analysis was performed in UGENE using GTR+I+G model.

Results and Discussion

Each of the populations showed high levels of morphological variation in the characteristics defined above (Figure 2). Even on a single plant, flowers showed variation in petal color and chevron presence/absence. Similarly, the petal apex varied from rounded to acute to acuminate with many intermediates present. Finally, the number of flowers per stem varied within a population from one to five flowers per stem. The "clumped" stems seem to relate

to plant age and health, with bulbs dividing over time to create offsets. Often, in addition to the main bulb, a small bulblet can be found below ground arising from the base of the leaves.

Individual specimens in the herbarium can appear dramatically different. Characteristics, including petal color, the chevron, petal tip, and size of specimens, vary; however, in the field, it is easy to find intermediates between the morphologies. Delimiting species based on the widely used "morphological cluster" species concept (Mallet 1995; Knapp 2008) indicates that due to overlapping characteristics, *C. nuttallii* and *C. ciscoensis* do not represent distinct species. The morphological cluster concept states that species are "assemblages of individuals with morphological features in common and separate from other such assemblages by correlated morphological discontinuities in a number of features." There is great variation in characteristics within *C. nuttallii*, but this variation is not consistently different, and intermediates exist for all of the defining characteristics.

Phylogenetic analysis showed a large genetic distance between the outgroup species *C. gunnisonii* and *C. leichtlinii* (Figure 3). Similarly, there was a large genetic distance between these outgroup species and a clade consisting of *C. nuttallii* + *C. ciscoensis*. For the phylogenetic analysis, we identified specimens based on the presence of a chevron (*C. nuttallii*) or the absence of a chevron (*C. ciscoensis*). However, the phylogenetic analysis indicated that specimens of *C. nuttallii* and *C. ciscoensis* were intermixed and showed low levels of genetic diversity. Given the large number of genetic differences between species like *C. gunnisonii* and *C. nuttallii* and the very small genetic differences and lack of clustering between *C. nuttallii* and *C. ciscoensis*, the molecular data also support the finding that *C. nuttallii* and *C. ciscoensis* do not represent distinct species.

Based on field and molecular data, it is our recommendation that *C. ciscoensis* be treated as a synonym of *C. nuttallii*. When viewing a single specimen in a photo or the herbarium, it may seem that there are distinct differences, such as petal color or the chevron. However, when viewing an entire population or comparing multiple populations, there is great morphological variation within the same species. While only one DNA region was sequenced, it supports these morphological observations. Further, more detailed study using next-generation, single-nucleotide polymorphism data, such as RAD-seq, would give much more detail into the population genetics of this species. Another interesting area of further study would be to test the chromosome ►

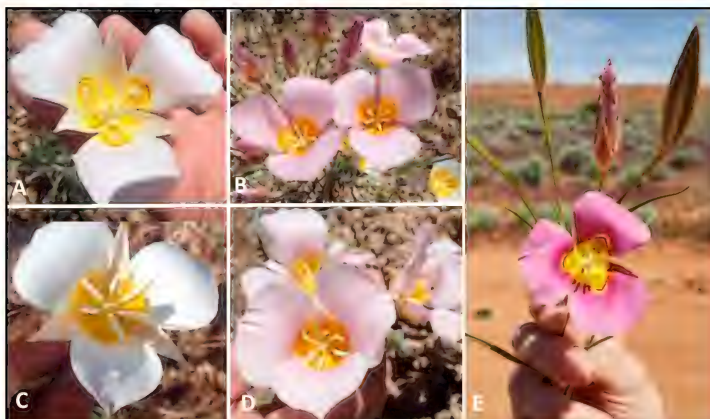


Figure 2: Floral variation in *C. nuttallii* from specimens observed in this study. A–D are all specimens from the same population in the McInnis Canyons National Conservation Area and occurred within feet of each other. E is a specimen from the northern part of the range near Rangely, CO. A–D. © Stephen Stern; E. © Elizabeth Aaron

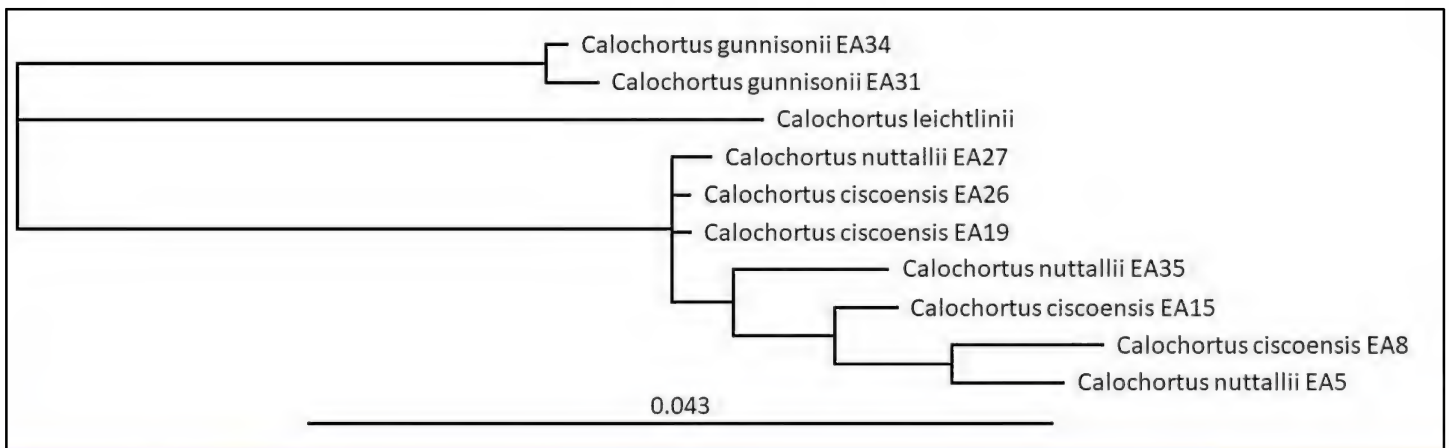


Figure 3: ITS phylogram of *Calochortus* specimens collected in this study. Branch length indicates genetic distance. Assignment of names indicates presence of a floral chevron (*C. nuttallii*) or absence of a chevron (*C. ciscoensis*).

◀ number of specimens from throughout the range of *C. nuttallii*. Ness et al. (1990) found that California species of *Calochortus* can have variable chromosome numbers without any corresponding morphological traits. We hope that our work will lead to further study of this beautiful and variable species.

Treating *C. ciscoensis* as a synonym of the widespread *C. nuttallii* will have conservation implications. The Utah Native Plant Society has *C. ciscoensis* listed as a high priority species for conservation attention (Alexander, 2016). Similarly, the Colorado Natural Heritage Program has *C. ciscoensis* listed as a fully tracked, G3/S1 species. Synonymizing this species would remove *C. ciscoensis* from both lists, allowing more focus on other species of concern.

Acknowledgments: This research was a summer undergraduate research project funded by the Saccomanno Internship Program in Biological Research. We thank Colorado Mesa University for use of facilities, including the herbarium and laboratory equipment.

Stephen Stern, PhD is a professor of biology at Colorado Mesa University. Elizabeth Aaron received her BS in Biology from CMU in the Spring of 2023.

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Calochortus gunnisonii

Artist: Ann Cooper

From *Aquilegia*. 1993. 17.1:9.

Germination of *Calochortus* Seeds

By Jim Borland

Since there are no "official" species designations for the common names of *sego lily* and *mariposa lily*, readers from various parts of the country may think that one or the other common names applies to the particular species found in their area. However, there are actually more than a dozen individual species of this lily. Other common names include globe lily and fairy lantern. Only a few of these species reside in Colorado.

Information gleaned from a variety of sources, including personal experience, indicates that most, if not all, of the seed of *Calochortus* species requires pretreatment before it will germinate in warm-moist conditions. In this case, the pretreatment is a simple one called stratification, which involves exposing the seed to both moist and cool conditions for a prescribed period of time. The "cool" part of the treatment is usually defined as temperatures above freezing but below 41°F. These temperatures can be created in a variety of ways, the simplest being merely planting the seed outdoors in the fall and letting Mother Nature supply the necessary conditions.

Since the seed is small and not to be sown deeply, keeping the soil moist until spring is a necessary challenge. I generally subject *Calochortus* seed to at least one month of stratification before attempting to germinate it in warm-moist conditions, and I have had great success. Others recommend at least three months of stratification. Some species seem to require almost a year of stratification to germinate. Anyone attempting to germinate any seed with unknown pretreatment or germination requirements would do well to keep some seed in reserve for another attempt, or sow the seed in the fall in a pot outdoors.

A more active method practiced by many involves sowing the seed as normal in a small pot, enclosing the whole thing inside a clear plastic bag and popping it into a refrigerator. One then marks the calendar for a day, one to three months later—if this period is known—that the pot is to be taken from the refrigerator, the plastic removed, and the pot placed in a warm, well-lit area for germination.

If the pretreatment period is not known, nothing is lost by exposing the seed to this treatment for three months, while periodically examining the pot for germination inside the refrigerator. When any germination is noted, the pot should be removed.

Don't expect much for the first and second years since only one small, thin leaf is produced per seed. Each seed, however, quickly produces a very small, white bulb that actually pulls itself down into the soil. So, don't be surprised when sifting through a pot of dead leaves when nothing is

found among the top surface layers of soil. And don't be surprised when you can't find the tiny bulbs among small granules of perlite in your soil because they look the same!

Go to the CoNPS website to see a list of specific stratification durations for nearly two dozen different species of *Calochortus*. <https://conps.org/wp-content/uploads/2023/12/Calochortus-germination-table.pdf>

Jim Borland has been fooling around with native plants for more than 40 years in private, commercial, and public venues. His home garden contains thousands of native plants, most grown from seed at home and not supplementally watered for 20 years. Jim has written hundreds of articles, given talks too numerous to count, and continues to grow and plant the two or three native plants not yet in his garden. ☺



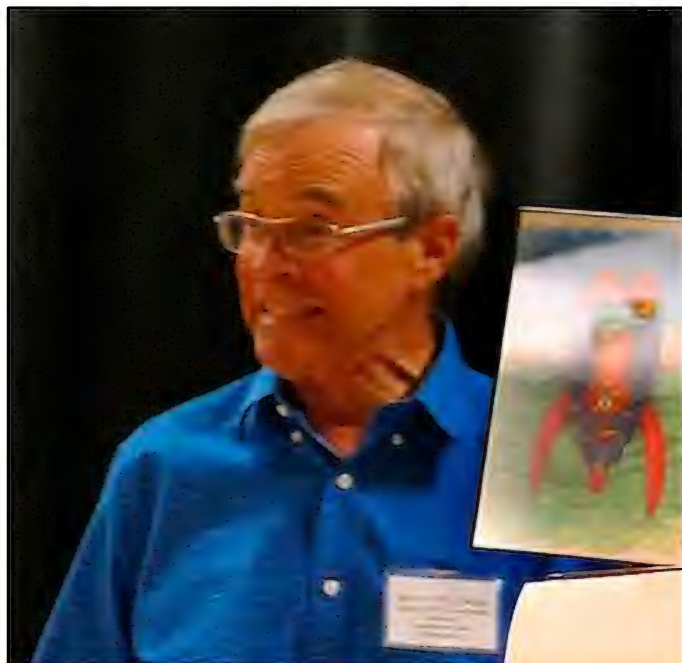
Calochortus gunnisonii (Gunnison's mariposa lily), McCullough Gulch, Colorado. © Kelly Ambler

Member Profile

Mo Ewing: Volunteer Extraordinaire!

By Jennifer Neale, Loraine Yeatts, and Linda Smith

The CoNPS Lifetime Achievement Award that Mo Ewing received at our 2023 Annual Conference was very well deserved. Mo's contributions to Colorado's native plants, their habitats, and the Colorado Native Plant Society have been tremendous.



Mo Ewing received the "SuperMo" award at the 2015 CoNPS Annual Conference. © Loraine Yeatts

Mo has been a member of CoNPS since 2003, when he moved to Colorado from New England. After two previous careers as a hospital administrator from 1968 to 1982, and president and owner of a travel company from 1982 to 1997, Mo discovered a new passion for native plants and plant communities while working for the New England Wild Flower Society in Massachusetts.

Mo was a late bloomer when it came to botany. At the ripe age of 56, he enrolled at Antioch University New England in Keene, New Hampshire, receiving a master's degree in Conservation Biology in 2002. He decided to finish his master's thesis in Colorado to see if the state was all it was cracked up to be, and has never left.

When Mo retired from Colorado Open Lands as its land stewardship director in 2009, he began to volunteer for a variety of organizations, including the Colorado Natural Areas Program (CNAP) and the

Denver Botanic Gardens. In 2009, he also became a CoNPS board member.

Soon after, Mo became the treasurer for CoNPS and the chair of the finance committee, which involved reconciling accounts, preparing financial statements, and overseeing financial affairs. Mo's investment skills have given CoNPS a strong financial footing for our growth as an organization. Without this foundation, CoNPS would not have been able to expand to the extent it has over the last 14 years. During the last year or two, Mo's duties as the chair of the finance committee expanded beyond what he probably ever expected—at one point, without a bookkeeper on staff, Mo ended up doing all the bookkeeping through Quickbooks for several months until CoNPS Executive Director Maggie Gaddis could find a new offsite bookkeeping system.

Beyond the financial aspect, Mo has many areas of interest revolving around native plants and their habitats. Around 2010, Mo became the chair of the CoNPS Conservation Committee. Since that time, the Conservation Committee, under Mo's leadership and with the help of several dedicated committee members, has kept a close eye on federal, state, and local issues, writing comment letters and signing on to the comment letters of other organizations. At least once a year, Mo has contributed articles to *Aquilegia's* Conservation Corner. ►



Mo Ewing, Dick Yeatts, Ginny Greer, and Frank Morrey exploring for rare plants on Mt. Epaulet, July 2014. © Loraine Yeatts



Mo Ewing crossing the Arkansas River during a bioblitz in Browns Canyon, June 2016. © Loraine Yeatts

◀ Over the years, Mo has also helped the Field Studies Committee to organize bioblitzes around Colorado. Additionally, for the Education Committee, Mo has been a prolific instructor for the past seven years or so, with his basic and very popular “Introduction to Colorado Wildflowers” workshop.

And...the Media Committee. Around 2012, when it was time for CoNPS to get its own website, Mo volunteered. Not once, but twice! He and Suzanne Dingwell gave it a complete update and revision two years ago. Both times, this was an all-consuming task, leaving not much time for Mo’s other interests and volunteer efforts. And yet, Mo did find some spare time to be a steward for the CNAP, going out once a year to his “properties”: Yanks Gulch/Upper

Greasewood Creek in Rio Blanco County, and Lookout Mountain in Moffat County.

Since 2009, Mo has also been a dedicated volunteer at the Research and Conservation Department of the Denver Botanic Gardens, working in the Kathryn Kalmbach Herbarium of Vascular Plants, participating on field trips for plant collecting, data entry, and more. He began as a Rare Plant Monitoring Steward (a program co-run with the CNAP). He joined in on field campaigns to track rare species and assisted with computer-based work in the winter months. He created maps of the first gap analyses for the herbarium collections to assess where future floristic and mycology field campaigns should venture to broaden our understanding of plants and fungi in Colorado. Mo has always had a willingness to learn new things and to teach himself how to do them when needed, a strength not everyone has! The hours he committed to assisting the team in the office were invaluable in planning the next year’s fieldwork. In the herbarium, he not only assisted in many tasks, but also contributed collections of his own.

Mo’s latest passion, and another huge contribution to our native plants, involves bryophytes and mosses. Stacey Anderson, Northern Chapter member, can attest to that (see below).

All in all, we’re not too sure how CoNPS could have survived the last 14 years without Mo. He’s been an extraordinary volunteer not only to our organization, but also to partner organizations, all on behalf of Colorado’s native plants and their habitats. A true Colorado treasure! Thank you, Mo!! We love you!!

Mo: Rocky Mountain Mosser

By Stacey Anderson

Mo Ewing’s bryophyte enthusiasm began in 2012 when Dr. William Weber—botanist and lichenologist, and former curator of the University of Colorado Museum Herbarium—suggested Mo should expand a Mount Blue Sky (previously known as Mt. Evans) vascular plant inventory, which Mo was conducting, to include mosses. That event led to a continuing partnership with outings where Mo would collect mosses and Dr. Weber (in his nineties at the time) would identify them. Mo found several mosses that were new state records, including *Conostomum tetragonum* (helmet moss) from the Gilpin County Library fen and *Zygodon viridissimus* var. *rupestris* (green rock yoke moss) from a seepy gorge in Gateway Mesa, Castle Rock. Eventually, Bill became physically unable to go into the field, so, at his urging, Ron Wittmann joined with Mo, and they

returned to Gateway Mesa and found *Ditrichum rhynchostegium* (ditrichum moss), another state record. Whenever he could, Mo would go on field trips with Ron. Two favorite places were Ceran St. Vrain and Mt. Epaulet Saddle, at 13,000 feet on Mount Blue Sky.

A project Mo took on in 2014, with Bill’s encouragement, was converting an interactive Colorado moss key created by Pat Nelson from IBM punch cards to the Lucid program. Mo added 50 genera to the key and worked on it for two and a half years. It was one of the most important ways he learned to identify mosses, and he still uses it, along with dichotomous keys, to identify mosses he collects.

In the fall of 2019, Stacey Anderson approached Mo about forming a moss group to help with the difficult job of identifying collections, especially during the ►

◀ pandemic, since working together in person was almost impossible. Bill Weber's passing in 2020, at the age of 101, left a huge hole in Mo's mossing adventures, so, when Stacy asked Mo to help coordinate a Zoom group, he eagerly took on the project. The Virtual Moss Lab—or, as Mo likes to refer to it, the “Rocky Mountain Mossers”—continues to meet every two weeks, with eight active members from Colorado, New Mexico, and Arizona. Identification conundrums, interesting finds, new research findings, personal projects, and most things moss-related are discussed during meetings. Mo feels there have been many benefits—including forming new friendships—from working with other moss enthusiasts and experts online and during collecting trips.

At the present time, Mo is working to expand the identification keys to the mosses of New Mexico in the soon-to-be-completed *Flora Neomexicana IV: Bryophytes (Mosses & Liverworts)* by Kelly Allred, Russ Kleinman and Karen Blisard. With permission from the authors, and using that key as a foundation, Mo wants to add the moss genera of Colorado so that it can also be used as a companion tool with *Bryophytes of Colorado: Mosses, Liverworts, and Hornworts* by Bill Weber and Ron Wittmann.



Hylocomium splendens (mountain fern moss).
<https://bryophytes.myportfolio.com/canada-british-columbia-and-alberta> © Des Callaghan (with permission)

Mo feels that identifying mosses is difficult, but that is the reason he continues to do it. He really likes the challenge. His favorite moss is *Hylocomium splendens* (mountain fern moss).

Learn more about Colorado mosses on the CoNPS website. <https://conps.org/home-2/resources/plants-habitats/bryophytes/> 🌀

Blast from the Past

Adapted from Conservation Corner, Aquilegia. 2013. 37.1:1-4

CoNPS Takes on Summit Lake Conservation Project

By Mo Ewing

From his collecting visits in the 1950s, to an article he wrote in *Aquilegia* in August 1991, to the present day, Bill Weber has been a champion for Summit Lake on [Mount Blue Sky]. Last January [2012], a group of volunteers met with Bill and Ron Wittmann to consider taking on [Mount Blue Sky] as a long-term conservation project for our Society. Armed with our species lists, Loraine Yeatts, Janet Wingate, Megan Bowes, Fran Enright, Linnea Gilman, and I spent a total of 25 person-days over the summer of 2012 identifying, collecting, and mapping the plant communities and rare plants at the Lake. Interestingly, although botanists had collected plants from the lake since 1939, the plant communities at the lake had never been described or mapped.

Summit Lake is owned by the City and County of Denver as part of its Mountain Parks system. It is located in a glacial cirque with a huge, gently sloping terminal glacial moraine that fans out to the northeast toward Denver. The lake itself is at 12,840 feet elevation and, at 33 acres, is by far the largest lake in Colorado over 12,500 feet. Because of the extensive wetlands and because the park is located in a cirque,

the park has many different aspects, slopes, and hydrological regimes. This diversity results in a large number of very distinct plant communities.

We had no CoNPS volunteer who was knowledgeable enough to identify mosses, so I collected mosses at the lake and brought them down to Bill Weber in Boulder to identify. Of the 85 species of mosses previously documented at the lake, 30 species were found, including six considered to be rare in Colorado. In addition, six new, previously undocumented, species were collected and identified.

We identified and mapped 15 different plant communities, each with its own special suite of plants. We saw and documented 119 species of flowering plants, eight of them considered rare. So, in spite of the fact that the summer of 2012 was very hot and dry, and the bloom on [Mount Blue Sky] was quite constrained, we made excellent progress in beginning to understand Summit Lake; however, lots of questions remain.

<https://conps.org/wp-content/uploads/2021/10/Aquilegia-Vol.-37-No.-1-Spring-2013-Newsletter-of-the-Colorado.pdf> 🌀

News, Events, and Announcements

Please check the **Calendar of Events** online at <https://conps.org/event-calendar-2/#!calendar> for up-to-date information on webinars, chapter meetings, garden tours, field trips, and other events.

CoNPS may offer some chapter meetings, workshops, and lectures as webinars or other online meetings. Information will be posted online and will be promoted via the CoNPS E-News. Please register for each event to receive updates and follow-up communications.

CoNPS-Sponsored Events

Botany 101: Dichotomous Keys

Presented by Maggie Gaddis

January 11, 6:00 – 8:30 PM, virtual

Learn how to use a dichotomous key comfortably by keying out known species. This is the method Dr. Maggie Gaddis employs to educate her college students in a course called Plant Communities of Colorado at UCCS. Almost no one has a degree in botany, including Dr. Gaddis! But we have a need to know as restorationists, hobby botanists, citizen scientists and graduate students. Keying known species using a backwards annotation approach helps to build botanical vocabulary. It helps us to focus on what we need to see to be sure about a species identification in the field. It helps us to take better photographs that contribute to research through citizen science applications, including iNaturalist. In a future webinar, we will take the next step, thinking about how to take research grade photos that can be verified with dichotomous keys.

Propagation Workshop

Led by Ann Grant

January 13, 10:30 AM – 1:30 PM, in-person

Gardens on Spring Creek, Fort Collins

This will be a plant propagation workshop on native and regional seeds and plants. There will be a slide presentation on the science behind dormancy in seeds and how it can be overcome. Afterwards, we will get dirty, planting seeds, transplanting seedlings, and taking cuttings. You will bring home several pots of seeds, seedlings, and/or cuttings to grow on once you get home. Pots, seeds, all other plant material, and planting media will be provided. There is a wash station in the classroom, but bring gloves if you wish, or your own favorite cuttings tools. [Note: FULL]

Prairie & Riparian Restoration: Chatfield Style

Presented by Erik Geyer

January 17, 6:30 – 8:30 PM, virtual

This presentation will highlight riparian and prairie restoration projects at Denver Botanic Gardens Chatfield Farms. In 2015, we began working to restore

native plant communities along Deer Creek, a tributary of the South Platte, and to reconnect the stream with its historic floodplain. Two different approaches, working simultaneously, aim to improve the diversity of native plants, re-wet historic stream channels, and create a replicable approach to riparian restoration. In 2020, DBG began a prairie restoration project that incorporated the planting of oak seedlings. The goals of these projects are to reclaim a field of smooth brome grass and convert it to a diverse prairie matrix. Many of the lessons learned in the riparian restoration are applied to this soak savanna. Managing soil disturbance, improving native cover, and eliminating invasive plants all play a role in the long-term success and stability of these plantings.

Plant Families Workshop

Presented by Carol Dawson

January 20, 9:00, virtual

Did you ever wonder what characteristics make up different plant families? Recognizing families is a shortcut to plant identification. Join BLM State Botanist Carol Dawson and use her book (included in your registration) as a reference to discuss plant families.

Volunteer Training for Loveland Open Lands and Trails: Presentation Practices for Colorado Native Plant Society

January 23, 10:00 AM – NOON, in-person

Chilson Senior Center, Loveland

Loveland Open Lands and Trails Department is looking for volunteers to lead wildflower walks and hikes, give talks on gardening with native plants and weed identification, and help maintain the four native plant gardens at two natural areas in Loveland. Volunteers can assume leadership for some popular walks and hikes, or even design their own programs. Most programs will be conducted outdoors during the growing season. This is a great opportunity for you to share your knowledge of native plants and ecosystems with the general public. They have designed a special program for CoNPS members to get your questions answered. ►

◀ **Post-fire Plant Recovery in Colorado Ponderosa Pine Forests**

Presented by Paula Fornwalt

February 7, 7:00 - 8:30 PM, virtual

Dr. Paula Fornwalt, Research Ecologist with the US Forest Service Rocky Mountain Research Station will discuss research examining some of the factors that influence the recovery of trees and understory plants in Colorado's burned ponderosa pine forests. She will also share research looking at how tree planting can best be done to expedite tree recovery where it is not occurring naturally.

Seed Basics Workshop

Led by Annette Miller

February 10, 9:30 AM – 2:00 PM, in-person

Gardens on Spring Creek, Fort Collins

Learn about fruits, seeds, and embryos. What's inside? What happens in germination? Why don't some seeds germinate? What do seed labs and seed analysts do? Bring your seeds and seed questions.

The Ditch and the Meadow: An Accidental Ecological Restoration Project Revived a Neighborhood

Presented by Susan Tweit

February 29, 6:30 – 8:00 PM, virtual

When botanist and writer Susan J. Tweit and her late husband bought a half-block of blighted industrial property bordering a channelized creek at the edge of downtown Salida, Tweit had no idea that she would spend the next two decades restoring a block of that creek and the adjacent land. Nor that her accidental ecological restoration project would change her life and help revitalize their down-at-the-heels neighborhood. The story of the Ditch and the Meadow demonstrates the power of restoring native plants and removing invasive species to heal not only our landscapes, but also our communities. Join Susan for this 45-minute digital presentation, followed by discussion.

A Rare Plant Detective Story—Chapin Mesa Milkvetch (*Astragalus schmollii*)

Presented by Renee Rondeau

Hosted by the Southwest Chapter

March 7, 6:30 – 8:30 PM, virtual and in-person

Fort Lewis College campus

The Chapin Mesa milkvetch's entire population resides on Chapin Mesa at Mesa Verde National Park and Ute Mountain Ute tribal land and is considered one of Colorado's rarest plants. Beginning in 1980, a master's student collected population data on this rare plant and found it to be abundant within certain areas. Then in 2001, the Colorado Natural Heritage Program

conducted a population estimate and found a large reduction, with the density significantly lower than in 1980. In 2002, nearly half of the population was burned. The US Fish and Wildlife Service has been considering listing this species as a threatened or endangered species and a population decline is reason to be concerned. Like most other scientists, Renee strongly believes that more data is always needed! We have been collecting vital statistics on this plant since 2001, yet we still have unanswered questions. The rest of the story will be revealed at the talk.

Rooted in Restoration: Denver Zoo's Role in Conserving Colorado's Grasslands

Presented by Kate Wilkins and Tim Luethke

April 3, 6:30 – 8:00 PM, virtual

This talk will explore the conservation value of grassland ecosystems and Denver Zoo's work to restore Colorado's prairies. More specifically, the presentation will address Denver Zoo's conservation actions at Daniels Park and the power of community engagement in achieving our conservation goals. By sharing our work, we hope to inspire and empower individuals to become stewards of Colorado's grasslands and beyond.

Introduction to Colorado Wildflowers from Plains to Peaks

Presented by Mo Ewing

April 13, 9:00 AM – NOON, virtual

Become acquainted with the wonderful world of Colorado wildflowers and get started on developing skills to identify different species found on the eastern and western slopes. In the first half of our webinar, we will discuss how plants are named and identified, review basic plant morphology, and look at the characteristics of 13 common plant families. After a short break, we will take a virtual tour of some wonderful places to hike, from the Pawnee Buttes on the eastern great plains to the spectacular montane flowers of Gothic, to the pinyon-juniper woodlands in Colorado National Monument, pointing out some of the common species that you will see there.

Delinquent Late-night Pollinators: A Story about Nectar Bats, Agaves, and Hummingbird Feeders

Presented by Mallory Davies

Hosted by the Northern Chapter

April 18, 6:30 – 8:30 PM, virtual

The shape, color, and timing of nectar release of agave flowers indicates a co-evolution and mutualistic relationship with the nectar bats that pollinate it. ►

◀ Agave nectar is thought to be the only known plant food source for nectar bats in New Mexico. However, nectar bats are found visiting hummingbird feeders in New Mexico late into the fall, months after the agave have finished flowering. To address this timing mismatch, Davies' research focuses on the motivations of movement into New Mexico of the three nectar bats that persist in the United States, the lesser long-nosed bat (*Leptonycteris yerbabuenae*), the Mexican long-nosed bat (*Leptonycteris nivalis*), and the Mexican long-tongued bat (*Choeronycteris mexicana*). She will discuss the theory behind the mutualistic relationship and co-evolution of nectar bats and agave, current research happening in the southwestern US, and their preliminary findings.

Recurring Events

2023 Annual Conference Talks Revisited 15th of the month, January–April, 7:00 - 8:00 PM, virtual

Join us in revisiting the 2023 CoNPS Annual Conference through these viewing sessions on the 15th of each month. Bring some popcorn and cozy up to your computer.

Our beautiful conference entitled Flora of the San Luis Valley: History, Culture, and Science took place on Saturday, September 23, 2023, at Richardson Hall, Adams State University, Alamosa, CO. Our speakers and partners led field trips on Sunday, September 24. We will watch the recording of the following conference talks in these monthly meetings.

January 15: Plant responses to herbivory by elk and bison, Dr. Kate Schoenecker

February 15: Flora of the San Luis Valley, Dr. Mat Sharples

March 15: Possible new species of sunflower in Sand Dunes National Park, Peter Innes, PhD candidate

April 15: The taste of change: How chokecherry jelly sculpted my horticultural mindset, Alex Crochet

Sustainable High Altitude Gardening Education (SAGE)—An Online Learning Community

Led by Maggie Gaddis, Horticulture Committee
January 16, January 30, February 13, February 27
NOON – 2:00 PM, virtual

Learn and use principles of sustainable high-altitude gardening through this self-paced and supportive online learning community! We will focus on native plants but will also address edible gardening. Work through course materials at your own pace and share your questions, progress, and photos at biweekly

Zoom meetings. Materials for each module will be available upon registration.

The curriculum covers the following topics:

- The ecology of your home landscape
- Selecting species and making a garden calendar
- Plant propagation
- Wise water planning and use in the garden
- Planting and maintaining your garden
- Harvesting flowers, plants, and seeds

CoNPS Committee Updates

Conservation Committee

Submitted by Brad Klafehn

Over the last six months, the Conservation Committee commented on five agency proposals—including a petition to the US Forest Service for rulemaking to protect fens—and signed on to a letter with other native plant societies. These comments are available on the [CoNPS website](#).

The first letter concerned the Bears Ears Fuels Reduction and Restoration Project northwest of Steamboat Springs. This proposal on National Forest land involves a variety of fuel-reduction measures, including prescribed burns. Our comment letter noted that the area contains three G3-ranked plant associations, which are not mentioned at all in the Forest Service analysis. We said that USFS needs to protect these areas from any negative effects of the fuel-reduction efforts, and we asked the agency to consult with the Colorado Natural Heritage Program (CNHP) to get actual location information of these “Vulnerable to Extinction” associations. We also asked USFS to begin routinely researching CNHP’s Potential Conservation Areas when preparing environmental analyses.

The second comment concerned the Bureau of Land Management’s proposed Public Lands Rule, which seeks to make “conservation” an acknowledged “multiple use” under the Federal Land Policy Management Act of 1976, BLM’s charter legislation. Part of this proposed rule involves the new idea of issuing “conservation leases,” similar to mineral or grazing leases, in order to promote the restoration of degraded ecosystems. Our unique take on this aspect of the rule highlights the fact that, since it seems oriented toward uses like compensatory mitigation or ecosystem services payments to for-profit entities, non-profits like ours would be faced with a host of upfront financial costs to obtain a conservation lease, thereby discouraging citizen groups from using conservation leases to cooperate with BLM in restoring native plant and riparian habitat. CoNPS was joined in this comment by the native plant societies of Arizona and New Mexico. Hopefully, we can ►

◀ continue cooperating with these other western-state native plant societies. There's strength in numbers! Rocky Mountain Wild also included this idea in their proposed talking points on the Public Lands Rule, and Public Employees for Environmental Responsibility distributed it to their network of contacts.

In October, we submitted comments on rulemaking by the Energy and Carbon Management Commission (ECMC), formerly the Colorado Oil and Gas Conservation Commission, about properly evaluating and defining "cumulative impacts of oil and gas operations," as mandated by [Section 6](#) of HB23-1294, the air-pollution bill signed into law last June, including impacts on biological resources. We called for the commission to determine the amount of habitat that has already been affected by oil and gas development. Currently, we have no idea how much land has been, and is being, disturbed by oil and gas extraction. We also called for an annual cumulative report on reclamation of oil and gas sites, and noted that ECMC's definition of "revegetation" is outdated and incomplete, requiring future rulemaking. We were joined in these comments by groups such as Western Resource Advocates, who emphasized the need for getting data on existing acreage impacts on sensitive native plant communities, including on Colorado Parks and Wildlife's High Priority Habitat areas.

We are also part of a coalition formally objecting to the Grand Mesa, Uncompahgre and Gunnison (GMUG) National Forest's [Revised Forest Plan](#). After considering our comments made in 2018 and 2021, the GMUG did add 10 of our suggested plants to their Species of Conservation Concern list, but they didn't add others that also merit protection. We also object to their plans for managing invasive plants, which only address one percent of the known infestations per year and won't address herbicide impacts on rare plants for 10 years.

CoNPS also is proud to be an initial co-sponsor of WildEarth Guardians' and Wilderness Workshop's rulemaking petition to the US Forest Service to protect fens nationwide. We are asking for one sentence to be added to USFS's rules: prohibiting "[d]isturbing, draining, excavating, digging in, removing, discharging a pollutant into, or otherwise damaging, any fen resource." The advocates of this rule anticipate this being a yearslong process that will involve public education and advocacy nationwide. We are happy that the Native Plant Society of New Mexico has joined us in this request, as well.

Last, we signed on to a letter asking the Biden administration to preserve and strengthen the Endangered Species Act of 1973 on its fiftieth anniversary.

<https://conps.org/home-2/about-us/committees/conservation-committee/public-comment/>
<https://leg.colorado.gov/bills/hb23-1294>
<https://www.fs.usda.gov/project/gmug/?project=51806>

Education and Outreach Committee

Meets on third Wednesdays of the month

NOON – 1:00 PM, virtual

This Committee educates and empowers residents through adult programs, school/youth programs, community outreach, and writing opportunities.

Field Studies Committee

Led by Gwen Kittel

Meets on second Wednesdays of the month

NOON – 1:00 PM, virtual

This committee works on the Adopt-a-Rare plant program in partnership with Colorado Natural Heritage Program and on the Todd Gulch Fen Phenology Project.

Grants and Scholarships Committees

Led by Anne Beard

Meets on third Thursdays of the month

8:00 – 9:00 AM, virtual

Horticulture Committee

Led by Ann Grant, Alex Smith, and Alex Crochet

Meets on third Mondays of the month

NOON – 1:00 PM, virtual

This Committee stewards several CoNPS Programs, including:

- Native Plant Garden certification program;
- Native plant and seed availability: sales, swaps, and propagation training;
- Native plant garden tours; and
- Education and outreach events

The Horticulture Committee also manages BudBurst, a citizen science project (<https://budburst.org/about-us/our-partners/colorado-native-plant-society/>).

Media Committee

Meets on third Tuesdays of the month, as needed

8:00 – 9:00 AM, virtual

Led by Kelly Ambler

Are you interested in helping us get the word out about our wonderful Colorado native plants? If so, the Media Committee is the place for you! The committee is responsible for the production of the CoNPS magazine, *Aquilegia*, oversight of the website, social media (e.g., Facebook, Instagram, etc.), and eNews. Do you have an interesting story about native plants? Write an article! Are you social-media savvy? Help manage our Instagram and Facebook feeds! A people person? Conduct an interview. A reader? Write a book review! ►

◀ The Media Committee has been exploring ways to inform the general public about the importance of native plants. As such, we plan on distributing print copies of *Aquilegia* to libraries and other entities.

And are you attending any CoNPS-sponsored events? How about submitting a summary and/or photos of your activity to *Aquilegia* or posting on social media? We would love to hear from you!

Restoration Committee

Led by Maggie Gaddis

Meets on third Fridays of the month

NOON – 1:00 PM, virtual

This committee stewards the USFS Region 2 Rocky Mountain Plant Materials Program.

CoNPS Chapter Updates

Boulder Chapter

Starting in the spring, the Boulder chapter led field trips to Joder Ranch, Enchanted Mesa, Hessie, Spruce Gulch, Todd Gulch Fen, and Rabbit Mountain. During the spring and summer, chapter members volunteered at Harlequin's Gardens to seed and pot plants for the CoNPS plant sales. Its fall and winter chapter meetings included presentations on paleobotany, the CU Mountain Research Station, post-fire recovery on USFS land, riparian restoration in Rocky Mountain National Park, NOAA's soil-moisture monitoring initiative, and grassland-restoration research.

Metro-Denver Chapter

This year, the Metro-Denver chapter held its meetings in the state-of-the-art Alliance Center. We focused on making our meetings accessible to all our members by

conducting hybrid meetings for almost every month. We would like to thank our wonderful speakers: Jacqueline Mattos, Chris Helzer, Luke Wheeler, Amanda Slover, Maggie Gaddis, Liz Goehring, Jim Tolstrup, Julie Lehman, and Tim Berg, who were nice enough to present for our chapter on everything from groundbreaking phylogenetic research to water conservation in municipalities to efforts within the community to plant more native flora. We ended the year with a holiday party, which was well attended. We thank our team leaders—Rick Miller, Kelly Kirk, Elizabeth Wu, Tim Berg, and Rahman Minhas—for coming together and bringing forth knowledge and activities that have benefitted our community. Rahman Minhas will be stepping down from a leadership role in the Denver-Metro Chapter next year. We hope that some of our members would like to participate in the leadership of the chapter in 2024. It is a worthwhile experience! Rahman has found it an honor to have served CoNPS for the last three years and is thankful for the opportunity, especially because it was a positive outlet when he was grieving the loss of his sister, Maureen Fiore.

Plateau Chapter

Meets on the second Mondays of each month,
7:00 – 8:30 PM

Southeast Chapter

The Southeast chapter held its sixth and last meeting of 2023 in October, with a virtual presentation of 67 member photos from 15 different contributors. The photos were taken all along the Front Range, from Soapstone Prairie Natural Area in Larimer County to the Comanche National Grassland in Otero County.

The Southeast chapter had 11 field trips during 2023, beginning in late April at Tunnel Drive in Canon City and ending in late August at the Catamount Ranch Open Space in Teller County.

Southwest Chapter

The Southwest chapter had a great summer with seven field trips ranging from the greater environs of Durango to the high alpine ecosystems of the San Juan Mountains, including wetlands, meadows, and tundra. We are grateful to all our fantastic trip leaders! We rounded out the season with a fantastic ethnobotany workshop in October, led by Donna Thatcher, director of Riverside Nature Center in Farmington, New Mexico. We kicked off our winter lecture series in November with our first presenter, Haley Perez, a recent graduate of Fort Lewis College. She told us about her process for creating a new botanical field guide for the Durango Nature Center. We are currently recruiting speakers for the series. In addition, we are seeking a new chapter president or leadership team for 2024. ☯



The group on the Hessie field trip. © Kelly Ambler

Cross-Pollination Events



Landscaping with Colorado Native Plants Conference

**February 24
Boulder**

Keynote Session: The Land Was Always a Garden
Presented by David Newsom

There will be three concurrent breakout sessions, each consisting of a "New to Natives" and "Knows the Natives" presentations.

Closing Session: Native Garden Charrette

We will have vendor booths available during registration, lunch, and breaks. Lunch will be provided.

<https://landscapingwithcoloradonativeplants.wordpress.com/>



Colorado Alliance for Environmental Education (CAEE) Spring Conference

April 12

Join CAEE in Breckenridge for our Spring Conference where we will explore best practices for designing student-centered, nature-centered programming, with an emphasis on social emotional learning! We will explore innovative ways to

engage students in a learning environment that is not only centered around their needs but also focused on the outdoors. Expect a day filled with inspiring discussions, hands-on workshops, and a chance to connect with educators across the state!

<https://caee.org/springconference>

More Events

January 10–11

Annual Design Symposium: Landscape, Ecology & Culture

<https://www.ser.org/events/EventDetails.aspx?id=1813013&group=>

January 11

Translating SB23-270, Projects to Restore Natural Stream Systems

Hosted by Audubon Society

<https://act.audubon.org/a/sb270-training>

January 15

Keller Scholarship in Horticultural Conservation
<https://www.bgci.org/job/fellowship-in-conservation-horticulture-bgci-us-the-garden-club-of-america/>

January 25

In the Life of Beetles: Superstars of Soil Health, Pollination, and More!

Xerces webinar

<https://xerces.org/events/none/in-life-of-beetles-superstars-of-soil-health-pollination-and-more>

January 27

National Seed Swap Day

January 31

Denver Audubon Funding application deadline

<https://denveraudubon.org/lois-webster-fund/>

January 31

International Wetlands Day

February 3

Habitat Hero Workshop

<https://rockies.audubon.org/events/landscaping-water-realities-high-plains>

February 21–22

Ecological Landscaping Alliance

<https://www.ecolandscaping.org/events/category/conference/>

February 21–23

Utah Weed Conference

<https://utahweed.org/weed-conference/>

February 22–25

Colorado Environmental Film Festival

<https://ceff.net/>

February 24–March 3

Colorado Home and Garden Show

<http://coloradogardenfoundation.org/colorado-garden-home-show>

March 5–7

Riparian Restoration Conference

<https://riversedgewest.org/get-involved/events/2024-riparian-restoration-conference-restoration-future>

March 12

Plant a Flower Day

March 16

Durango Botanic Gardens Conference

March 21

International Day of Forests

<https://www.un.org/en/observances/forests-and-trees-day> 🌳

Become a CoNPS Member

Name _____
 Address _____
 City _____ State _____ Zip _____
 Phone _____
 E-mail _____
 Chapter (optional) _____

- ☐ New ☐ Renewal
- ☐ Student \$17 ☐ Senior (65+) \$17 ☐ Individual \$25
☐ Family \$35 ☐ Plant Lover \$50 ☐ Supporting \$100
☐ Patron \$250 ☐ Benefactor \$500 ☐ Life Member \$800

☐ **Printed Color Copy** of the magazine, *Aquilegia*, \$20

CHAPTERS: Boulder, Metro-Denver, Northern (Ft. Collins-Greeley), Plateau (Grand Junction and West Slope), San Luis Chapter (Crestone, Alamosa, Salida), Southeast (Colorado Springs-Pueblo), Southwest (Durango), or Unaffiliated

If this is a change in address, please write your old address here.

Address _____
 City _____ State _____ Zip _____

☐ **Check box to receive information on volunteer opportunities**

DUES include the electronic version of the *Aquilegia* magazine, published quarterly.

The full color electronic publication arrives by PDF in member email boxes quarterly. For those members without email addresses, please apply for a scholarship to receive print copies.

Membership dues cover a 12-month period.

You may also join online at <https://conps.org/join-donate/>

CONTRIBUTIONS to CoNPS are tax deductible:

John Marr fund for research on the biology and natural history of Colorado native plants \$ _____

Myrna P. Steinkamp Memorial fund for research and other activities to benefit the rare plants of Colorado \$ _____

Alice Eastwood Scholarship fund to help support undergraduates pursuing bachelor's degrees that ultimately advance the mission of the Society \$ _____

Mission Grant to support the mission of the Society \$ _____
 Total included: \$ _____

Please make check payable to:

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Send completed form and full remittance to:
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 1536 Wynkoop Street, Suite 911
 Denver, CO 80202



2023 CoNPS Annual Conference Sponsors



More Photo Contest Winners





Colorado Native Plant Society

a non-profit organization dedicated to furthering the knowledge, appreciation, and conservation of native plants and habitats of Colorado through education, stewardship, and advocacy

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**Landscaping with
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Plants Conference
February 24**

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2023 Photo Contest Winners

